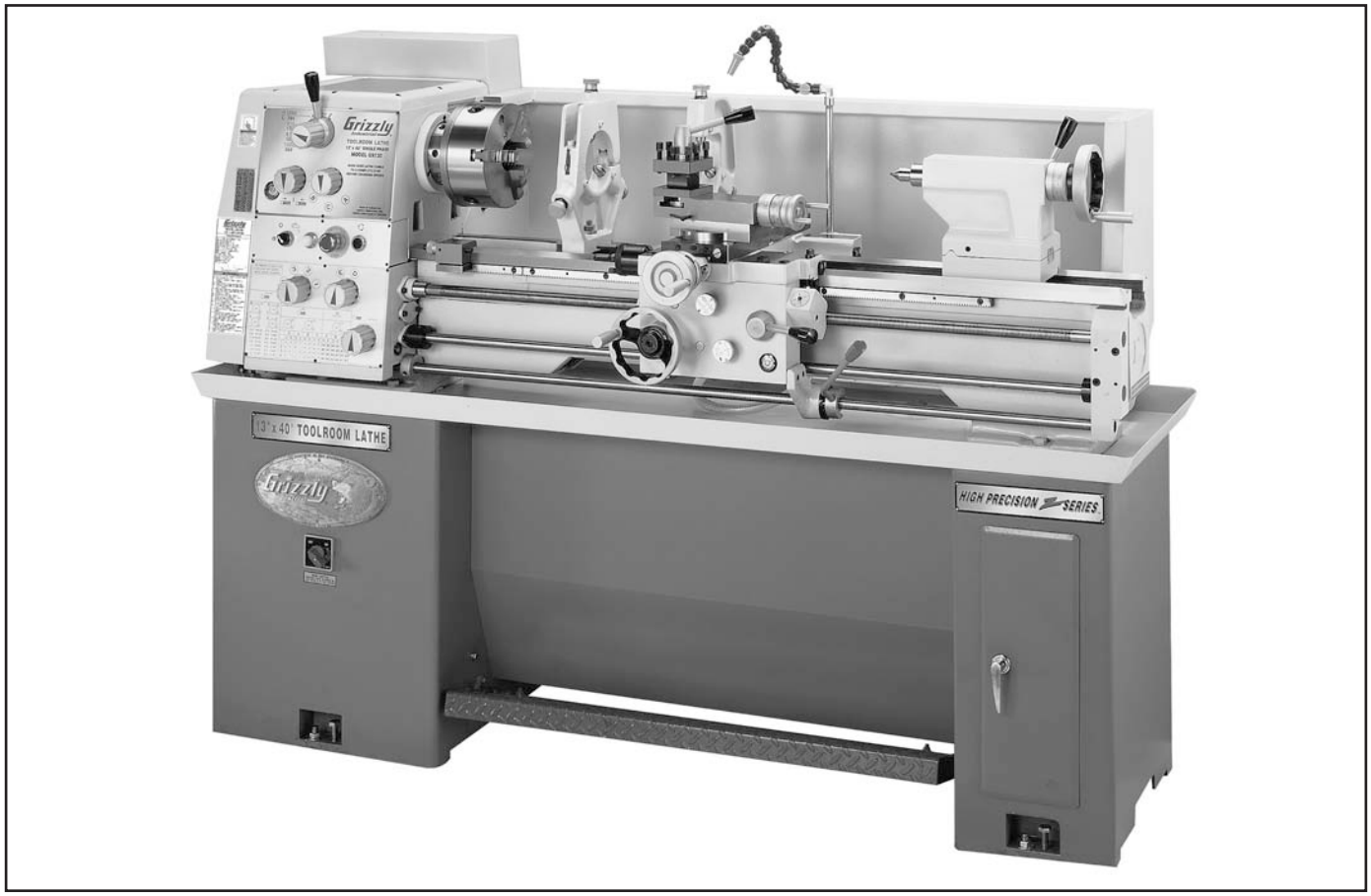
Grizzly Industrial, Inc.®

MODEL G9730/G9731
13" X 40" HIGH PRECISION TOOLROOM LATHE
OWNER'S MANUAL



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WARNING: NO PORTION OF THIS MANUAL MAY BE REPRODUCED IN ANY SHAPE OR FORM WITHOUT THE WRITTEN APPROVAL OF GRIZZLY INDUSTRIAL, INC.
(FOR MODELS MANUFACTURED SINCE 9/00) #TRCRBLTSJB12035 PRINTED IN TAIWAN

⚠ WARNING!

This manual provides critical safety instructions on the proper setup, operation, maintenance, and service of this machine/tool. Save this document, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine/tool is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, cutting/sanding/grinding tool integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

⚠ WARNING!

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- **Lead from lead-based paints.**
- **Crystalline silica from bricks, cement and other masonry products.**
- **Arsenic and chromium from chemically-treated lumber.**

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

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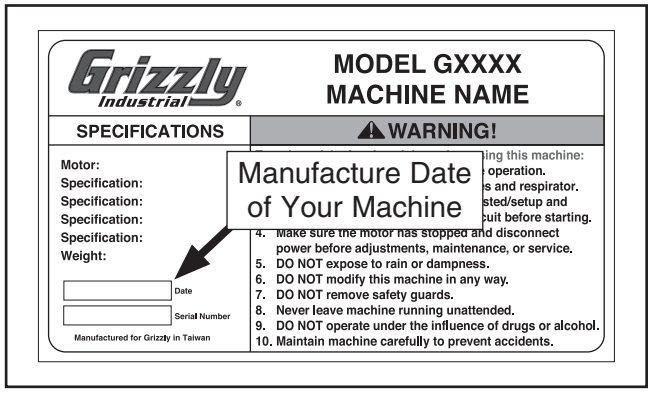
INTRODUCTION

Manual Accuracy

We are proud to offer this manual with your new machine! We've made every effort to be exact with the instructions, specifications, drawings, and photographs of the machine we used when writing this manual. However, sometimes we still make an occasional mistake.

Also, owing to our policy of continuous improvement, **your machine may not exactly match the manual**. If you find this to be the case, and the difference between the manual and machine leaves you in doubt, check our website for the latest manual update or call technical support for help.

Before calling, find the manufacture date of your machine by looking at the date stamped into the machine ID label (see below). This will help us determine if the manual version you received matches the manufacture date of your machine.



For your convenience, we post all available manuals and manual updates for free on our website at **www.grizzly.com**. Any updates to your model of machine will be reflected in these documents as soon as they are complete.

Contact Info

We stand behind our machines. If you have any questions or need help, use the information below to contact us. Before contacting, please gather the model number and manufacture date of your machine. This will help us help you faster.

Grizzly Technical Support
1203 Lycoming Mall Circle
Muncy, PA 17756
Phone: (570) 546-9663
E-Mail: techsupport@grizzly.com

We want your feedback on this manual. What did you like about it? Where could it be improved? Please take a few minutes to let us know.

Grizzly Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com

Machine Description

The Model G9730/G9731 metal lathe is used to remove material from a rotating workpiece, which is held in place on the spindle with a chuck or faceplate. The cutting tool is mounted on the carriage or tailstock and moved against the spinning workpiece to perform the cut.

This lathe has 8 available spindle speeds and powered feed for the carriage and cross slide. The use of the cutting fluid system and spindle brake is optional.

Typical cutting operations for a metal lathe include facing, turning, parting, drilling, reaming, grooving, knurling, and threading. There are a wide variety of tools and workpiece holding devices available for each of these operations.

Identification

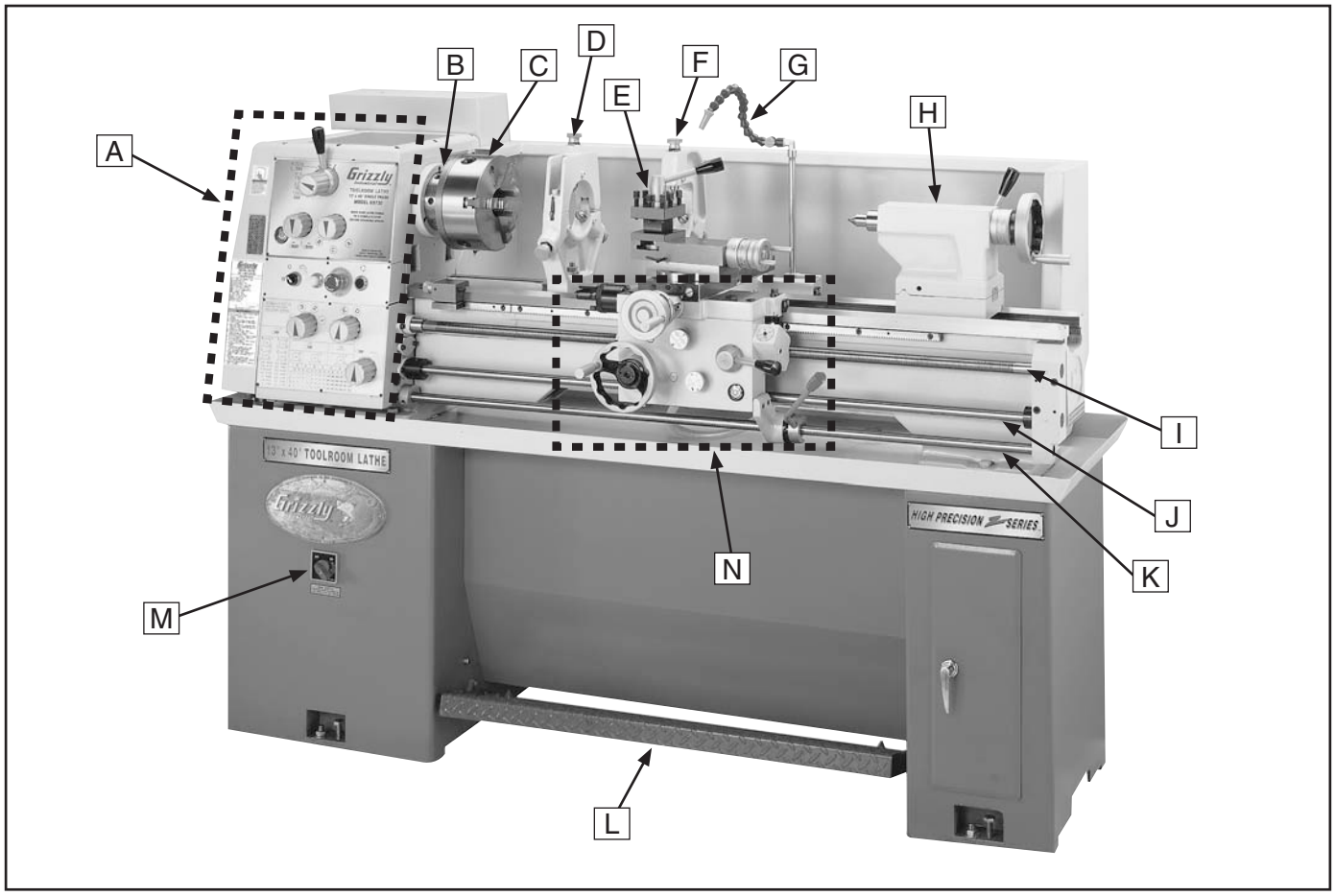
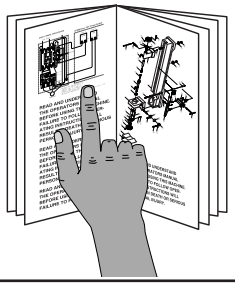


Figure 1. Identification.

A. Headstock (refer to **Headstock Controls** on **Page 28** for details)
B. Spindle
C. 3-Jaw Chuck
D. Steady Rest
E. 4-Way Tool Post
F. Follow Rest
G. Cutting Fluid Nozzle
H. Tailstock (refer to **Tailstock Controls** on **Page 30** for details)
I. Longitudinal Leadscrew
J. Feedrod
K. Spindle Control Rod
L. Foot Brake
M. Master Power Switch
N. Carriage (refer to **Carriage Controls & Components** on **Page 29** for details)



⚠WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.

MACHINE DATA SHEET

Customer Service #: (570) 546-9663 · To Order Call: (800) 523-4777 · Fax #: (800) 438-5901

MODEL G9730 13" X 40" HIGH PRECISION TOOL ROOM LATHE, 3 HP 220V SINGLE-PHASE

Product Dimensions:

Weight..... 1475 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 70 x 23-1/2 x 50 in.
Footprint (Length x Width)..... 71 x 22 in.

Shipping Dimensions:

Type..... Wood Slat Crate
Content..... Machine
Weight..... 1621 lbs.
Length x Width x Height..... 30 x 73 x 62 in.

Electrical:

Minimum Circuit Size..... 30 amp
Switch..... Magnetic Switch with Thermal Overload Protection
Switch Voltage..... 220V
Plug Included..... No

Motors:

Main

Type..... TEFC Capacitor Start Induction
Horsepower..... 3 HP
Voltage..... 220V
Prewired..... 220V
Phase..... Single
Amps..... 20A
Speed..... 1725 RPM
Cycle..... 60 Hz
Number Of Speeds..... 1
Power Transfer ..... Belt Drive to Gear
Bearings..... Shielded and Permanently Lubricated

Main Specifications:

Operation Info

Swing Over Bed..... 13 in.
Dist Between Centers..... 40 in.
Swing Over Cross Slide..... 7-1/2 in.
Swing Over Saddle..... 8 in.
Swing Over Gap..... 19-1/2 in.
Max Tool Bit Size..... 1/2 in.
Compound Travel..... 3-3/4 in.
Carriage Travel..... 35 in.
Cross Slide Travel..... 5-3/4 in.

Headstock Info

Spindle Bore	1-3/8 in.
Spindle Taper	MT#4.5
No Of Spindle Speeds	8
Spindle Speeds	105, 175, 260, 395, 610, 915, 1320, 2000 RPM
Spindle Type	D1-4 Cam Lock
Spindle Bearings	Tapered Roller
Spindle Length	16-1/4 in.
Spindle Length with 3-Jaw Chuck	21-3/4 in.
Spindle Length with 4-Jaw Chuck	20-3/8 in.

Tailstock Info

Tailstock Travel	4-5/16 in.
Tailstock Taper	MT#3
Tailstock Barrel Diameter	1.56 in.

Threading Info

No Of Inch Threads	32
Range Of Inch Threads	4 - 56 TPI
Range Of Longitudinal Feeds	0.0015 - 0.010 in.
No Of Longitudinal Feeds	24
No Of Cross Feeds	24
Range Of Cross Feeds	0.0005 - 0.0035 in./rev.
No Of Metric Threads	14
Range Of Metric Threads	0.5 - 6 mm

Dimensions

Bed Width	7-1/2 in.
Leadscrew TPI	8
Leadscrew Length	50 in.
Steady Rest Capacity	2-1/2 in.
Follow Rest Capacity	2-1/2 in.
Faceplate Size	10 in.
Leadscrew Diameter	7/8 in.
Feed Rod Diameter	3/4 in.
Floor To Center Height	44 in.

Construction

Base	Cast Iron
Headstock	Cast Iron
Headstock Gears	Flame Hardened Cast Iron
Bed	Induction Hardened Cast Iron
Body	Cast Iron
Stand	Cast Iron
Paint	Epoxy

Other

Kilowatt Output	2.2

Other Specifications:

Country Of Origin	Taiwan
Warranty	1 Year
Serial Number Location	On Right Back Side Machine Body (Machine's Electrical Control Panel), Above On/Off Switch

MACHINE DATA SHEET

Customer Service #: (570) 546-9663 · To Order Call: (800) 523-4777 · Fax #: (800) 438-5901

MODEL G9731 13" X 40" PRECISION TOOL ROOM LATHE, 3 HP 220V 3-PHASE

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Weight..... 1475 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 70 x 23-1/2 x 50 in.
Footprint (Length x Width)..... 71 x 22 in.

Shipping Dimensions:

Type..... Wood Crate
Content..... Machine
Weight..... 1597 lbs.
Length x Width x Height..... 30 x 73 x 62 in.

Electrical:

Minimum Circuit Size..... 15 amp
Switch..... Magnetic Switch with Thermal Overload Protection
Switch Voltage..... 220V
Plug Included..... No
Phase Converter..... G7978

Motors:

Main

Type..... TEFC Induction
Horsepower..... 3 HP
Voltage..... 220V
Prewired..... 220V
Phase..... Three
Amps..... 7.5A
Speed..... 1725 RPM
Cycle..... 60 Hz
Number Of Speeds..... 1
Power Transfer ..... Belt Drive to Gear
Bearings..... Shielded and Permanently Lubricated

Main Specifications:

Operation Info

Swing Over Bed..... 13 in.
Dist Between Centers..... 40 in.
Swing Over Cross Slide..... 7-1/2 in.
Swing Over Saddle..... 8 in.
Swing Over Gap..... 19-1/2 in.
Max Tool Bit Size..... 1/2 in.
Compound Travel..... 3-3/4 in.
Carriage Travel..... 35 in.
Cross Slide Travel..... 5-3/4 in.

Headstock Info

Spindle Bore	1-3/8 in.
Spindle Taper	MT#4.5
No Of Spindle Speeds	8
Spindle Speeds	105, 175, 260, 395, 610, 915, 1320, 2000 RPM
Spindle Type	D1-4 Cam Lock
Spindle Bearings	Tapered Roller
Spindle Length	16-1/4 in.
Spindle Length with 3-Jaw Chuck	21-3/4 in.
Spindle Length with 4-Jaw Chuck	20-3/8 in.

Tailstock Info

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No Of Metric Threads	14
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Dimensions

Bed Width	7-1/2 in.
Leadscrew TPI	8
Leadscrew Length	50 in.
Steady Rest Capacity	2-1/2 in.
Follow Rest Capacity	2-1/2 in.
Faceplate Size	10 in.
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Base	Cast Iron
Headstock	Cast Iron
Headstock Gears	Flame Hardened Cast Iron
Bed	Induction Hardened Cast Iron
Body	Cast Iron
Stand	Cast Iron
Paint	Epoxy

Other

Kilowatt Output	2.2

Other Specifications:

Country Of Origin	Taiwan
Warranty	1 Year
Serial Number Location	On Right Back Side Machine Body (Machine's Electrical Control Panel), Above On/Off Switch

SECTION 1: SAFETY

⚠WARNING
For Your Own Safety, Read Instruction Manual Before Operating this Machine

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

⚠DANGER **Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.**

⚠WARNING **Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.**

⚠CAUTION **Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.**

NOTICE **This symbol is used to alert the user to useful information about proper operation of the machine.**

⚠WARNING
Safety Instructions for Machinery

OWNER'S MANUAL. Read and understand this owner's manual BEFORE using machine. Untrained users can be seriously hurt.

EYE PROTECTION. Always wear ANSI-approved safety glasses or a face shield when operating or observing machinery to reduce the risk of eye injury or blindness from flying particles. Everyday eyeglasses are not approved safety glasses.

HAZARDOUS DUST. Dust created while using machinery may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material, and always wear a NIOSH-approved respirator to reduce your risk.

WEARING PROPER APPAREL. Do not wear clothing, apparel, or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to avoid accidental slips which could cause a loss of workpiece control.

HEARING PROTECTION. Always wear hearing protection when operating or observiing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

MENTAL ALERTNESS. Be mentally alert when running machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

⚠WARNING

DISCONNECTING POWER SUPPLY. Always disconnect machine from power supply before servicing, adjusting, or changing cutting tools (bits, blades, cutters, etc.). Make sure switch is in OFF position before reconnecting to avoid an unexpected or unintentional start.

APPROVED OPERATION. Untrained operators can be seriously hurt by machinery. Only allow trained or properly supervised people to use machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use—especially around children. Make workshop kid proof!

DANGEROUS ENVIRONMENTS. Do not use machinery in wet or rainy locations, cluttered areas, around flammables, or in poorly-lit areas. Keep work area clean, dry, and well-lighted to minimize risk of injury.

ONLY USE AS INTENDED. Only use machine for its intended purpose. Never modify or alter machine for a purpose not intended by the manufacturer or serious injury may result!

USE RECOMMENDED ACCESSORIES. Consult this owner's manual or the manufacturer for recommended accessories. Using improper accessories will increase the risk of serious injury.

CHILDREN & BYSTANDERS. Keep children and bystanders a safe distance away from work area. Stop using machine if children or bystanders become a distraction.

REMOVE ADJUSTING TOOLS. Never leave adjustment tools, chuck keys, wrenches, etc. in or on machine—especially near moving parts. Verify removal before starting!

SECURING WORKPIECE. When required, use clamps or vises to secure workpiece. A secured workpiece protects hands and frees both of them to operate the machine.

FEED DIRECTION. Unless otherwise noted, feed work against the rotation of blades or cutters. Feeding in the same direction of rotation may pull your hand into the cut.

FORCING MACHINERY. Do not force machine. It will do the job safer and better at the rate for which it was designed.

GUARDS & COVERS. Guards and covers can protect you from accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly before using machine.

NEVER STAND ON MACHINE. Serious injury or accidental contact with cutting tool may occur if machine is tipped. Machine may be damaged.

STABLE MACHINE. Unexpected movement during operations greatly increases the risk of injury and loss of control. Verify machines are stable/secure and mobile bases (if used) are locked before starting.

AWKWARD POSITIONS. Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make workpiece control difficult or increase the risk of accidental injury.

UNATTENDED OPERATION. Never leave machine running while unattended. Turn machine ***OFF*** and ensure all moving parts completely stop before walking away.

MAINTAIN WITH CARE. Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. An improperly maintained machine may increase the risk of serious injury.

CHECK DAMAGED PARTS. Regularly inspect machine for damaged parts, loose bolts, mis-adjusted or mis-aligned parts, binding, or any other conditions that may affect safe operation. Always repair or replace damaged or mis-adjusted parts before operating machine.

EXPERIENCING DIFFICULTIES. If at any time you are experiencing difficulties performing the intended operation, stop using the machine! Contact our Technical Support Department at (570) 546-9663.

⚠WARNING
Additional Safety for Lathes

CLEARING CHIPS. Metal chips can easily cut bare skin—even through a piece of cloth. Avoid clearing chips by hand or with a rag. Use a brush or vacuum to clear metal chips.

CHUCK KEY SAFETY. A chuck key left in the chuck can become a deadly projectile when the spindle is started. Always remove the chuck key after using it. Develop a habit of not taking your hand off of a chuck key unless it is away from the machine.

TOOL SELECTION. Cutting with an incorrect or dull tool increases the risk of accidental injury due to the extra force required for the operation, which increases the risk of breaking or dislodging components that can cause small shards of metal to become dangerous projectiles. Always select the right cutter for the job and make sure it is sharp. A correct, sharp tool decreases strain and provides a better finish.

SECURING WORKPIECE. An improperly secured workpiece can fly off the lathe spindle with deadly force, which can result in a severe impact injury. Make sure the workpiece is properly secured in the chuck or faceplate before starting the lathe.

CHUCKS. Chucks are very heavy and difficult to grasp, which can lead to crushed fingers or hands if mishandled. Get assistance when handling chucks to reduce this risk. Protect your hands and the precision-ground ways by using a chuck cradle or piece of plywood over the ways of the lathe when servicing chucks.

SAFE CLEARANCES. Workpieces that crash into other components on the lathe may throw dangerous projectiles in all directions, leading to impact injury and damaged equipment. Before starting the spindle, make sure the workpiece has adequate clearance by hand-rotating it through its entire range of motion. Also, check the tool and tool post clearance, chuck clearance, and saddle clearance.

SPEED RATES. Operating the lathe at the wrong speed can cause nearby parts to break or the workpiece to come loose, which will result in dangerous projectiles that could cause severe impact injuries. Large or non-concentric workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.

STOPPING SPINDLE BY HAND. Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own, or use the brake.

CRASHES. Driving the cutting tool or other lathe components into the chuck may cause an explosion of metal fragments, which can result in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use, not leaving lathe unattended, and checking clearances before starting the lathe. Make sure no part of the tool, tool holder, compound slide, cross slide, or carriage will contact the chuck during operation.

LONG STOCK SAFETY. Long stock can whip violently if not properly supported, causing serious impact injury and damage to the lathe. Reduce this risk by supporting any stock that extends from the chuck/headstock more than three times its own diameter. Always turn long stock at slow speeds.

CUTTING FLUID SAFETY. Cutting fluid is a very poisonous biohazard that can cause personal injury from skin contact alone. Incorrectly positioned cutting fluid nozzles can splash on the operator or the floor, resulting in an exposure or slipping hazard. To decrease your risk, change the cutting fluid regularly and position the nozzle where the fluid will not splash or end up on the floor.

SECTION 2: POWER SUPPLY

Availability

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed. To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by a qualified electrician in accordance with all applicable codes and standards.

⚠WARNING

Electrocution, fire, or equipment damage may occur if machine is not correctly grounded and connected to the power supply.

Full-Load Current Rating

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

G9730 Full-Load Current Rating.....20 Amps
G9731 Full-Load Current Rating..... 7.5 Amps

The full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating.

If the machine is overloaded for a sufficient length of time, damage, overheating, or fire may result—especially if connected to an undersized circuit. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements in the following section.

Circuit Information

A power supply circuit includes all electrical equipment between the breaker box or fuse panel in the building and the machine. The power supply circuit used for this machine must be sized to safely handle the full-load current drawn from the machine for an extended period of time. (If this machine is connected to a circuit protected by fuses, use a time delay fuse marked D.)

⚠CAUTION

For your own safety and protection of property, consult a qualified electrician if you are unsure about wiring practices or electrical codes in your area.

Note: *The circuit requirements listed in this manual apply to a dedicated circuit—where only one machine will be running at a time. If this machine will be connected to a shared circuit where multiple machines will be running at the same time, consult a qualified electrician to ensure that the circuit is properly sized for safe operation.*

Circuit Requirements for 220V

This machine is prewired to operate on a 220V power supply circuit that has a verified ground and meets the following requirements:

G9730:
Nominal Voltage 220V/240V
Cycle ..... 60 Hz
Phase ..... Single-Phase
Circuit Rating ..... 30 Amps
Plug and Receptacle ..... NEMA L6-30
Cord ..... 3-Wire, 10 AWG, 300VAC, "S"-Type

G9731:
Nominal Voltage 220V/240V
Cycle ..... 60 Hz
Phase 3-Phase
Circuit Rating ..... 15 Amps
Plug and Receptacle ..... NEMA 15-15
Cord ..... 4-Wire, 14 AWG, 300VAC, "S"-Type

Grounding Instructions

This machine MUST be grounded. In the event of certain malfunctions or breakdowns, grounding reduces the risk of electric shock by providing a path of least resistance for electric current.

The power cord and plug specified under "Circuit Requirements for 220V" on the previous page has an equipment-grounding wire and a grounding prong. The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances (see figure below).

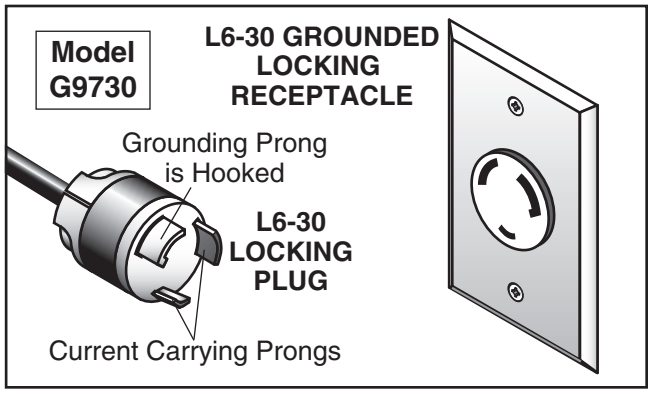


Figure 2. For Model G9730—Typical NEMA L6-30 plug and receptacle.

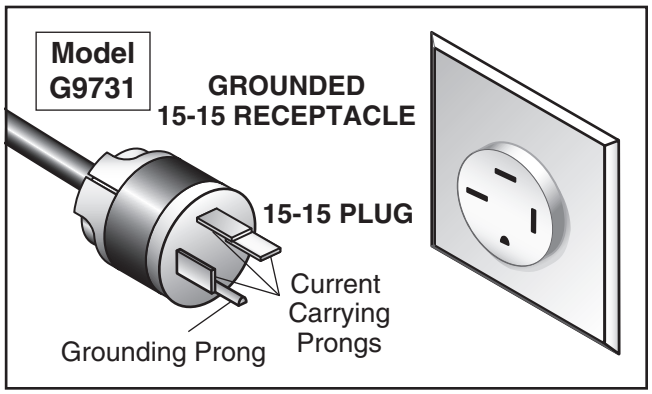


Figure 3. For Model G9731—Typical NEMA 15-15 plug and receptacle.

NOTICE

No adapter is available or should be used with this machine. If the machine must be reconnected for use on a different type of electric circuit, the reconnection should be made by qualified service personnel; and after reconnection, the machine must comply with all local codes and ordinances.

Improper connection of the equipment-grounding wire can result in a risk of electric shock. The wire with green insulation (with or without yellow stripes) is the equipment-grounding wire. If repair or replacement of the power cord or plug is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

Check with a qualified electrician or service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the tool is properly grounded. If you ever notice that a cord or plug is damaged or worn, disconnect it from power, and immediately replace it with a new one.

Extension Cords

We do not recommend using an extension cord with this machine. If you must use an extension cord, only use it if absolutely necessary and only on a temporary basis.

Extension cords cause voltage drop, which may damage electrical components and shorten motor life. Voltage drop increases as the extension cord size gets longer and the gauge size gets smaller (higher gauge numbers indicate smaller sizes).

Any extension cord used with this machine must contain a ground wire, match the required plug and receptacle, and meet the following requirements:

G9730 Minimum Gauge Size .....10 AWG
G9731 Minimum Gauge Size .....14 AWG
Maximum Length (Shorter is Better).....50 ft.

Correcting Phase Polarity (G9731)

This subsection is only provided for troubleshooting. If you discover during the test run that the lathe will not operate, or that the spindle runs backwards, the lathe may be wired out of phase. Correcting this is simply a matter of reversing the positions where two of the incoming power source wires are connected. Without the proper test equipment to determine the polarity of the power source legs, wiring machinery to 3-phase power may require trial-and-error.

To correct wiring that is out of phase:

1. DISCONNECT LATHE FROM POWER!

2. Open the main junction box (see **Figure 4**) and swap any two of the three hot wires coming from the power source.

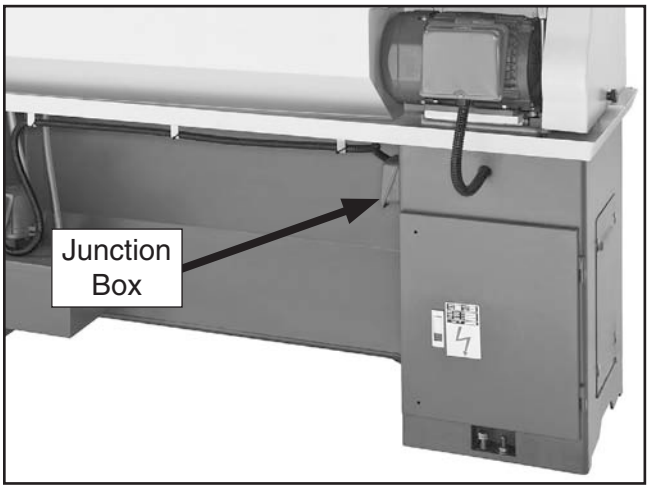
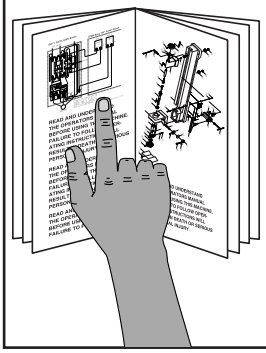


Figure 4. Location of main junction box.

3. Close the junction box and reconnect the lathe to power.

SECTION 3: SETUP



⚠WARNING

This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!

⚠WARNING

Wear safety glasses during the entire setup process!

⚠WARNING

This machine and its components are very heavy. Get lifting help or use power lifting equipment such as a forklift to move heavy items.

⚠WARNING

SUFFOCATION HAZARD!

Keep children and pets away from plastic bags or packing materials unpacked with this machine. Discard immediately.

Needed for Setup

The following are needed to complete the setup process, but are not included with your machine.

- For Lifting and Moving:
  - —A forklift or other power lifting device rated for at least 2500 lbs.
  - —Two lifting straps rated for at least 2500 lbs. each
  - —(Optional) Chain and safety hook rated for at least 2500 lbs. each
  - —Two other people for moving machine
  - —Precision Level

- For Assembly:
  - —Shop Rags
  - —Cleaner/degreaser (see **Page 17**)
  - —Quality metal protectant oil
  - —Safety glasses for each person
  - —Wrench 10mm
  - —Floor mounting hardware (see **Page 21**)
  - —Precision level at least 12" long

Unpacking

Your machine was carefully packaged for safe transportation. Remove the packaging materials from around your machine and inspect it. If you discover the machine is damaged, *please immediately call Customer Service at (570) 546-9663 for advice.*

Save the containers and all packing materials for possible inspection by the carrier or its agent. *Otherwise, filing a freight claim can be difficult.*

When you are completely satisfied with the condition of your shipment, inventory the contents.

Inventory

The following is a description of the main components shipped with your machine. Lay the components out to inventory them.

If any non-proprietary parts are missing (e.g. a nut or a washer), we will gladly replace them; or for the sake of expediency, replacements can be obtained at your local hardware store.

Inventory (Figures 5–7)	Qty
A. 3-Jaw Chuck 7" w/Outside Jaw Set	1
B. Steady Rest	1
C. Follow Rest	1
D. 4-Way Tool Post	1
E. Faceplate 10"	1
F. Backing Plate 8"	1
G. 4-Jaw Chuck 8" w/Jaw Set	1
H. 4-Jaw Chuck Key	1
I. 3-Jaw Chuck Inside Jaw Set	1
J. 3-Jaw Chuck Key	1
K. Drive Plate 7"	1
L. Touch-up Paint	2
M. MT#3 Dead Centers	
—Steel-Tipped	1
—Carbide-Tipped	1
N. MT#4.5–MT#3 Sleeve	1
O. Combo Wrenches	
11/13, 12/14, 17/19	1 Each
P. Toolbox	1
Q. Cast Iron Foot Pads	4
R. Change Gears 30T, 32T, 40T, 40T	1 Each
S. Hex Wrenches 8, 6, 5, 4, 3mm	1 Each
T. Carriage Handwheel Handles	2
U. Leadscrew Shear Pins	2
V. 4-Way Tool Post Key	1

NOTICE

If you cannot find an item on this list, check the mounting location on the machine or the packaging materials. Sometimes parts are pre-installed for shipping, or they become hidden by packaging materials.

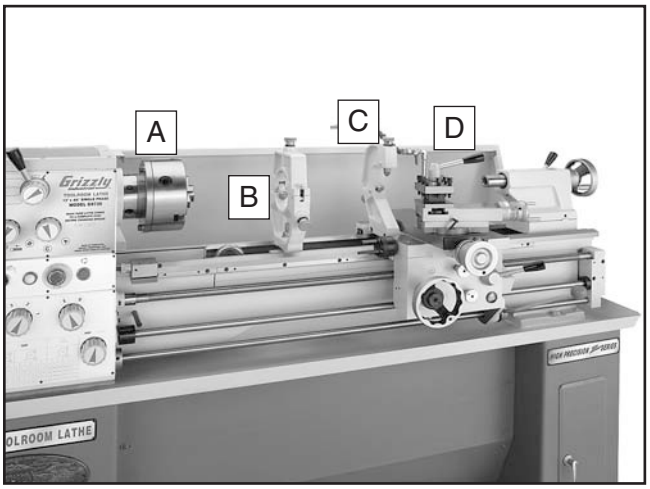


Figure 5. Installed components.

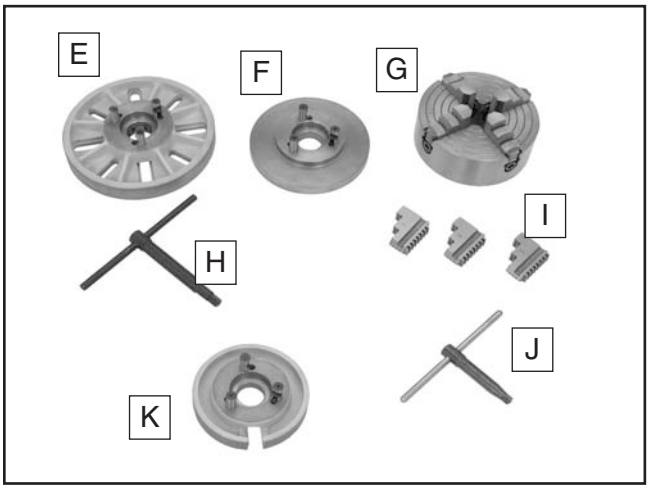


Figure 6. Chuck and faceplate components.

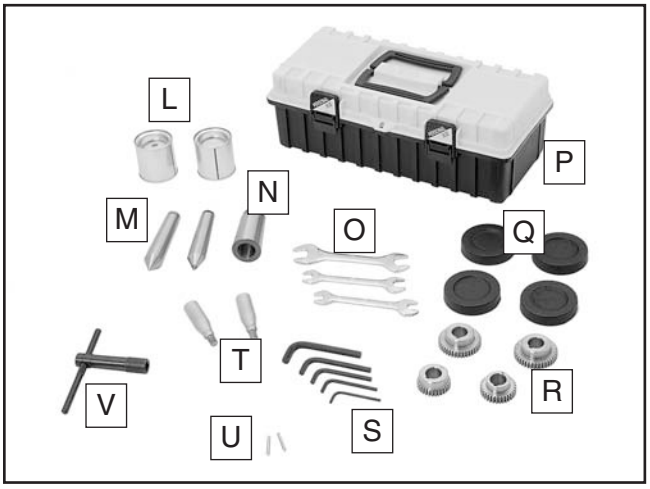


Figure 7. Toolbox components.

Cleanup

The unpainted surfaces of your machine are coated with a heavy-duty rust preventative that prevents corrosion during shipment and storage. This rust preventative works extremely well, but it will take a little time to clean.

Be patient and do a thorough job cleaning your machine. The time you spend doing this now will give you a better appreciation for the proper care of your machine's unpainted surfaces.

There are many ways to remove this rust preventative, but the following steps work well in a wide variety of situations. Always follow the manufacturer's instructions with any cleaning product you use and make sure you work in a well-ventilated area to minimize exposure to toxic fumes.

Before cleaning, gather the following:
- Disposable Rags
- Cleaner/degreaser (WD•40 works well)
- Safety glasses & disposable gloves
- Plastic paint scraper (optional)

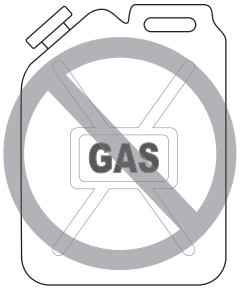
Basic steps for removing rust preventative:

1. Put on safety glasses.

2. Coat the rust preventative with a liberal amount of cleaner/degreaser, then let it soak for 5–10 minutes.

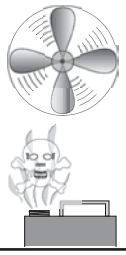
3. Wipe off the surfaces. If your cleaner/degreaser is effective, the rust preventative will wipe off easily. If you have a plastic paint scraper, scrape off as much as you can first, then wipe off the rest with the rag.

4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant to prevent rust.



⚠WARNING

Gasoline or products with low flash points can explode or cause fire if used to clean machinery. Avoid cleaning with these products.



⚠CAUTION

Many cleaning solvents are toxic if concentrated amounts are inhaled. Only work in a well-ventilated area.

NOTICE

Avoid chlorine-based solvents, such as acetone or brake parts cleaner, that may damage painted surfaces. Test all cleaners in an inconspicuous area before using to make sure they will not damage paint.

H9692—Orange Power Cleaner & Degreaser
One of the best cleaners we've found for quickly and easily removing rust preventative.

Figure 8. Model H9692 Industrial Orange Power Cleaner/Degreaser (99.9% biodegradable).

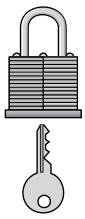
Site Considerations

Weight Load

Refer to the **Machine Data Sheet** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual. **See below for required space allocation.**



⚠CAUTION

Children or untrained people may be seriously injured by this machine. Only install in an access restricted location.

Physical Environment

The physical environment where your machine is operated is important for safe operation and the longevity of its components. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature range exceeds 41°–104°F; the relative humidity range exceeds 20–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

Electrical Installation

Place this machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave access to a means of disconnecting the power source or engaging a lockout/tagout device.

Lighting

Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

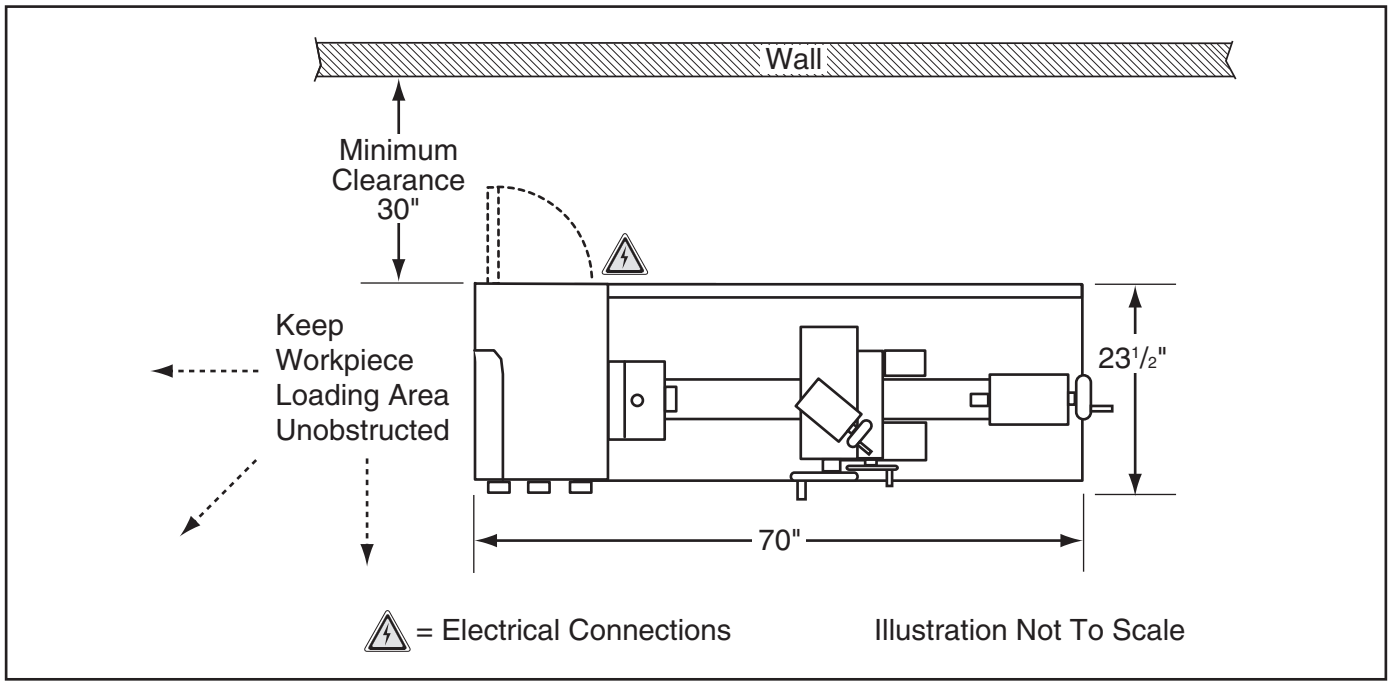
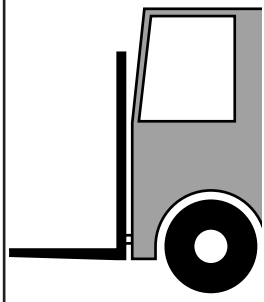


Figure 9. Minimum working clearances.

Lifting & Placing



⚠WARNING

The Model G9730/G9731 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use power equipment to move the shipping crate and remove the machine from the crate.

Do not attempt to lift or move this lathe without using a forklift and the necessary assistance from other people. Each piece of lifting equipment must be rated for at least 2500 lbs. to support dynamic loads that may be applied while lifting. Refer to **Needed for Setup** on **Page 15** for details.

There are two methods of lifting the lathe: 1) Using lifting straps, and 2) using a chain and safety hook.

To lift and place the lathe:

1. Review the **Power Supply** section on **Page 12** and make proper preparations for the power connection. Make any other necessary preparations of the permanent location for the lathe.

2. To balance the lifting load, loosen the tailstock lock lever (see **Figure 10**), move the tailstock to the right end of the bedway, then lock it in place.

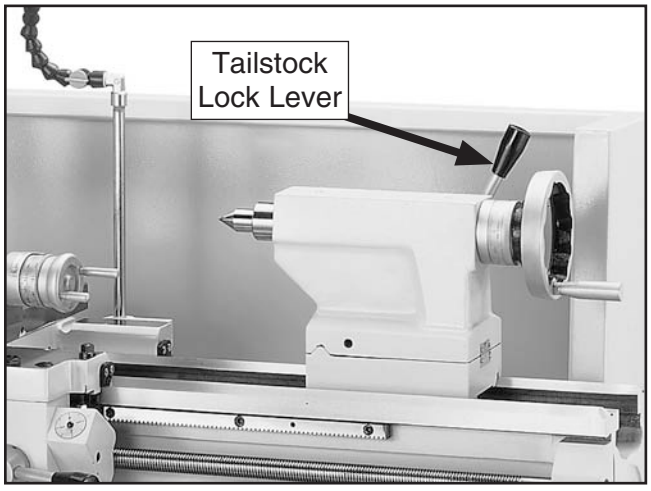


Figure 10. Tailstock lock lever.

3. To further balance the load, move the carriage next to the tailstock as follows:

   a) Loosen the carriage lock shown in **Figure 11**.

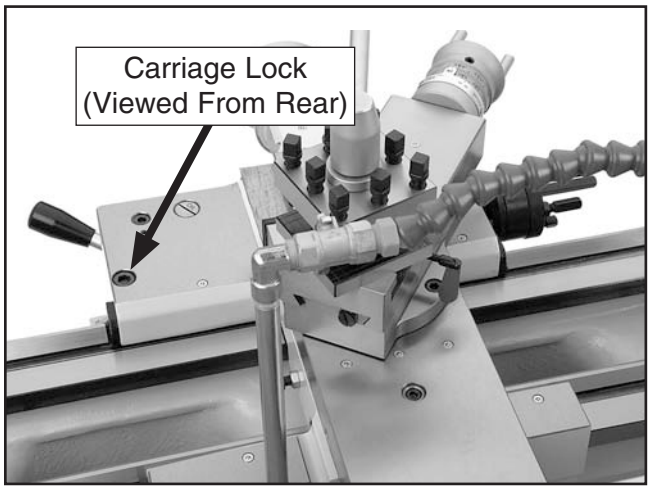


Figure 11. Location of carriage lock.

b) Pull the halfnut lever up to disengage the carriage from the leadscrew (see **Figure 12**).

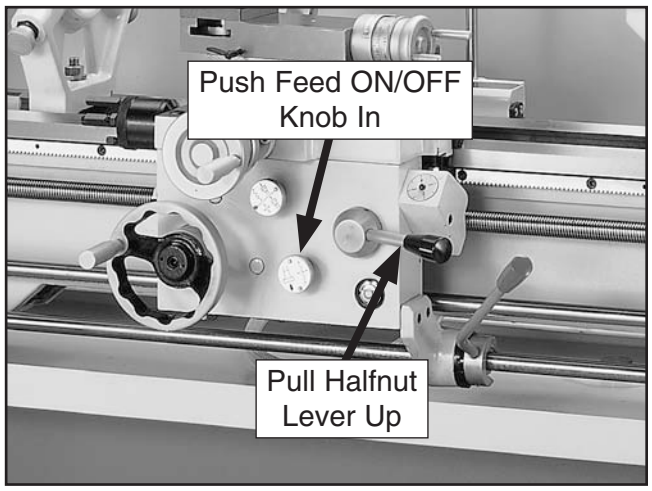


Figure 12. Halfnut lever and feed ON/OFF knob.

c) Push the feed ON/OFF knob in to disengage the carriage from the feedrod (see **Figure 12**).

d) Use the carriage handwheel to move the carriage next to the tailstock.

4. Use one of the following methods to attach the lathe to the forklift.

—*Lifting Straps:* Wrap the two lifting straps around the lathe bed, as illustrated in **Figure 13**. Thread the straps between the leadscrew and rods so that no pressure is put on these devices when the lathe is lifted.

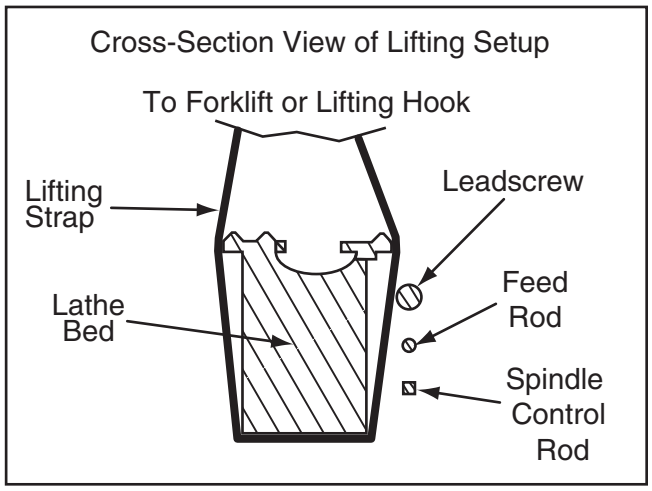


Figure 13. Lifting straps wrapped around the lathe bed.

Attach the lifting straps to the forklift forks, as illustrated in **Figure 14**.

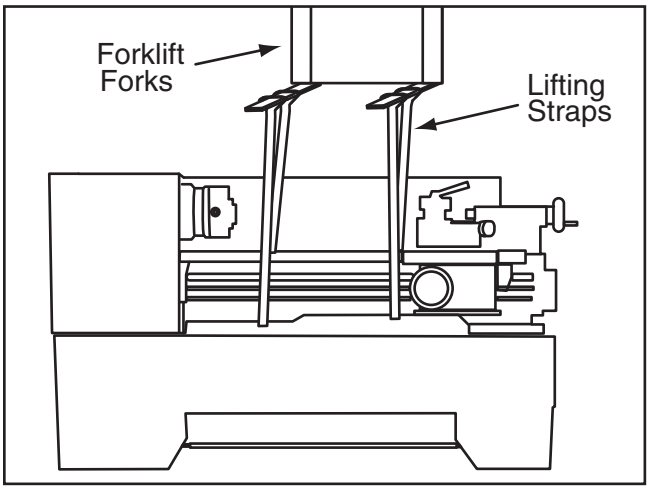


Figure 14. Lifting the lathe with lifting straps.

—*Chain & Safety Hook:* Thread and fully tighten the provided lifting eye bolt into the pre-drilled hole in the lathe bed, as shown in **Figure 15**. Then connect the safety hook and chain between the lathe and the power lifting equipment.

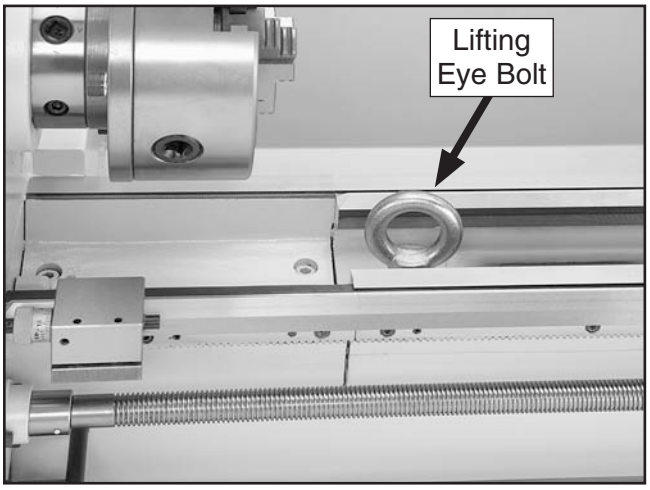


Figure 15. Lifting eye bolt installed.

5. With the help of two other people to keep the load from swaying, raise the lathe a couple of inches.

—If the load is not well balanced, or you see any other difficulties with the lifting equipment, immediately lower the lathe to the pallet again. Resolve any lifting or balancing issues, then repeat this step.

If you are using the *Chain & Safety Hook* method of lifting the lathe, you might try installing the lifting eye bolt in the center hole on the lathe bed.

6. Lift the lathe enough to clear the shipping pallet and any small floor obstacles, then move it to the prepared location and lower it in place.

Mounting

Although not required, we recommend that you secure your new machine to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Generally, you can either bolt your machine to the floor or mount it on the provided cast iron foot pads. Both options are described below. Whichever option you choose, it is necessary to level your machine with a precision level.

Bolting to Concrete Floors

Anchor studs and lag shield anchors with lag screws (**Figure 16**) are two popular methods for anchoring an object to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best that fits your specific application.

NOTICE

As the lathe is used, the cast iron parts may shift slightly. Re-check the bedway to make sure it remains level after the first 24 hours, after the first two weeks, then annually thereafter.

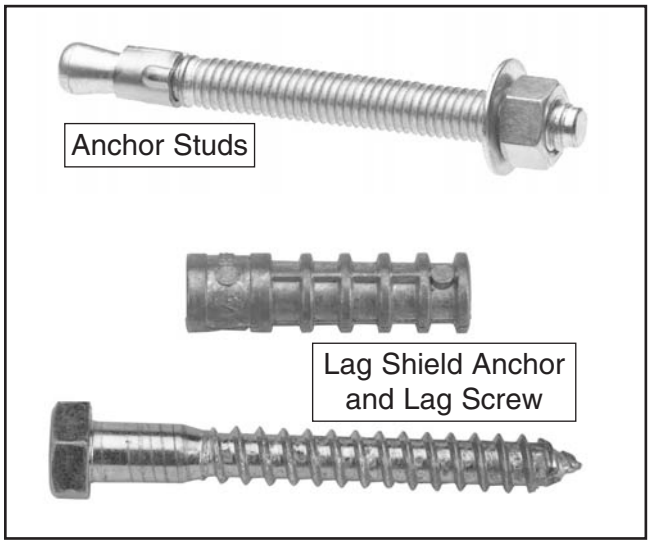


Figure 16. Typical fasteners for mounting to concrete floors.

Use a precision level on the lathe bedway and metal shims between the lathe and the floor to make the bedway level from front to back and side to side.

Cast Iron Foot Pads

To use the cast iron foot pads, place them under the adjustable jack bolts (see **Figure 17**), then use a precision level on the bedway and adjust the jack bolts until the bedway is level from front to back and from side to side. When level, tighten down the jack bolt jam nuts to secure the settings.

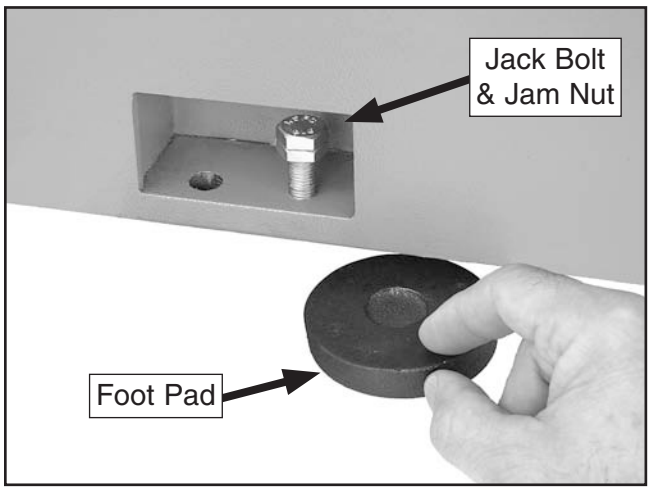


Figure 17. Cast iron foot pad and jack bolt.

Assembly

The lathe is shipped from the factory pre-assembled except for the two handwheel handles. Use a 10mm wrench to attach these handles to the carriage and cross slide handwheels, as shown in **Figure 18**.

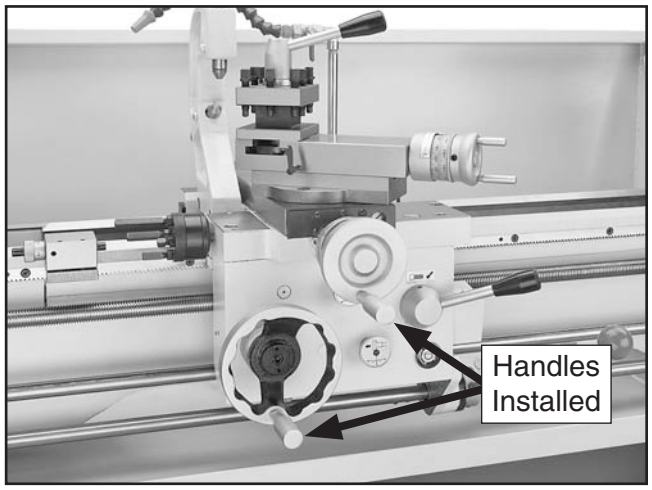


Figure 18. Carriage and cross slide handwheel handles installed.

Lubricating Lathe

The headstock, quick change gearbox, and apron reservoirs must have the proper amount of oil in them before the lathe can be operated for the first time.

Running the lathe without oil in a gearbox could result in damage to the bearings and gears—such damage is not covered under warranty.

Refer to **Lubrication**, beginning on **Page 64**, for detailed instructions on how to check and add oil.

In addition to the gearboxes, we also recommend that you lubricate all other points on the machine at this time.

Note: *If your lathe was shipped with oil in the reservoirs, do not change that oil until after the break-in procedure.*

Adding Cutting & Brake Fluids

To successfully complete the **Test Run** in the following pages, the cutting and brake fluid levels must be checked, and if necessary, fluid must be added to each system.

Add the cutting fluid of your choice now. For detailed instructions on where the cutting fluid reservoir is located and how to add fluid, refer to **Cutting Fluid System** on **Page 69**.

Check the brake fluid level and add additional fluid if necessary, as instructed in **Brake Fluid** on **Page 71**.

Power Connection

Before the machine can be connected to the power source, an electrical circuit and connection device must be prepared per the **POWER SUPPLY** section in this manual, and all previous setup instructions in this manual must be complete to ensure that the machine has been assembled and installed properly.

Always make sure the power switch on the machine is turned OFF (or the OFF button is pushed in) before connecting power.

Connecting to Power

Insert the plug attached to the machine power cord into a matching power supply receptacle. The machine is now connected to the power source.

Disconnecting Power

If you need to disconnect the machine from power later, pull the plug completely out of the receptacle.

Test Run

Once the assembly is complete, test run your machine to make sure it runs properly and is ready for regular operation.

The test run consists of verifying the following:

- The motor powers up and runs correctly
- For the Model G0931 only, the motor turns in the correct direction (machine is not wired out of phase)
- The emergency STOP button safety feature works correctly
- The brake system works correctly
- The cutting fluid system works correctly

If, during the test run, you cannot easily locate the source of an unusual noise or vibration, stop using the machine immediately, then review **Troubleshooting** on **Page 75**.

⚠WARNING

Before starting the lathe, make sure you have performed the preceding assembly and adjustment instructions, and you have read through the rest of the manual and are familiar with the various functions and safety features on this machine. Failure to follow this warning could result in serious personal injury or even death!

To test run the lathe:

1. Read and follow the safety the instructions at the beginning of the manual, take required safety precautions, and make sure all previous preparation steps discussed in the manual have been followed and completed.
2. Clear away all tools and objects used during the assembly, lubrication, and preparation.

3. Make sure the master power switch is turned ***OFF*** (see **Figure 19**).

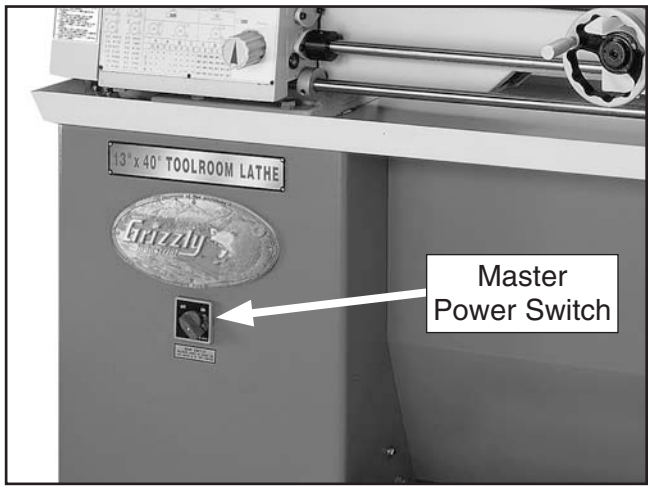


Figure 19. Location of the master power switch.

4. Make sure that the chuck and jaws, if installed, are secure (refer to **Chuck & Faceplate Mounting** on **Page 31**).

5. Make sure the cutting fluid switch (see **Figure 20**) is in the OFF position, then point the fluid nozzle down into the chip tray.

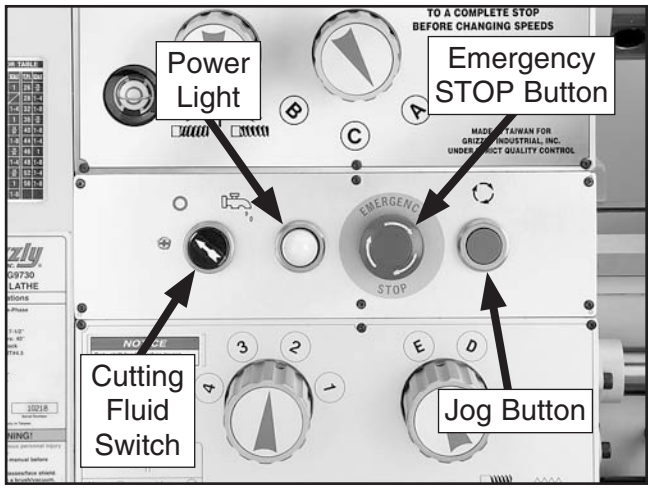


Figure 20. Control panel identification.

6. Push the emergency STOP button in to prevent unintentional start-up.

7. To ensure the carriage components do not unexpectedly move when the lathe is started, rotate the headstock feed direction knob so that the arrow points to the middle (neutral) position (see **Figure 21**).

Note: *It may be necessary to rock the chuck back-and-forth by hand when moving the controls to enable the gears to mesh.*

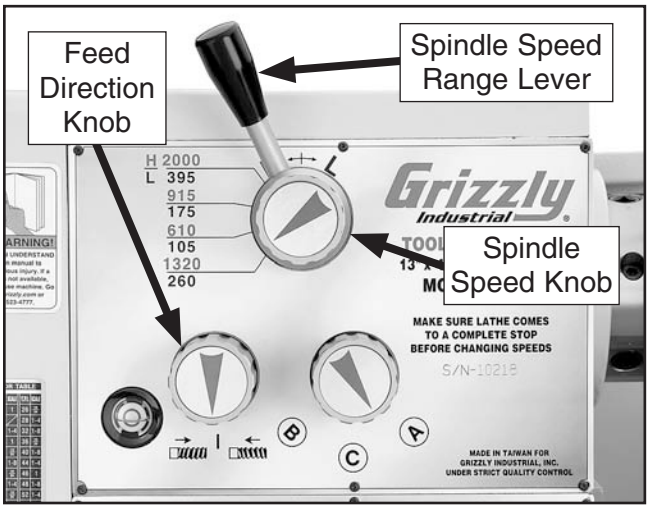


Figure 21. Headstock controls.

8. To further ensure the carriage does not move during the test run, push the feed ON/OFF knob in to disengage the carriage from the feedrod, then pull the halfnut lever up to disengage the carriage from the leadscrew (see **Figure 22**).

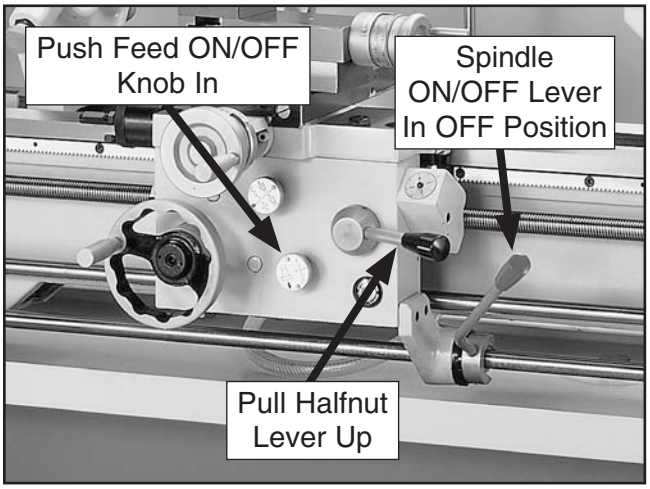


Figure 22. Halfnut lever, feed ON/OFF knob, and spindle ON/OFF lever.

9. Pull the spindle ON/OFF lever out, move it to the OFF (middle) position, then release it so that it slips into the detent.

10. Move the spindle speed range lever to the low (right) position, and rotate the spindle speed knob so that the arrow points to 105 (see **Figure 21**).

11. Turn the master power switch ***ON***.

12. Reset the emergency STOP button by twisting it clockwise until it pops out—the power light on the control panel should illuminate.

13. Verify that the machine is operating correctly by pulling the spindle ON/OFF lever out and down to start spindle rotation.

—When operating correctly, the lathe runs smoothly with little or no vibration.

—Investigate and correct strange or unusual noises or vibrations before operating the lathe further. Always disconnect the lathe from power when investigating or correcting potential problems.

14. For the Model G9731 Only: With the spindle ON/OFF lever in the down position, the spindle should be rotating counterclockwise—down and toward you as you face the lathe.

—If the spindle is not rotating counterclockwise with the spindle ON/OFF lever in the down position, the power supply has been connected out of phase. Stop the lathe, turn the master power switch ***OFF***, disconnect the lathe from power, then follow the instructions in **Phase Polarity** on **Page 14**.

After correcting the wiring, repeats **Steps 11–14**.

15. Move the spindle ON/OFF lever to the OFF (middle) position, press the emergency STOP button in, then attempt to re-start spindle rotation.

—If the lathe does not start with the emergency STOP button pressed in, this safety feature is working properly.

—If the lathe does start with the emergency STOP button pressed in, this safety feature is not operating correctly. The emergency STOP button must operate properly before continuing operation. Use the spindle ON/OFF lever to stop the lathe, turn the master power switch ***OFF***, disconnect the lathe from power, then call Tech Support for help.

16. Reset the emergency STOP button, re-start spindle rotation, then press the foot brake. The lathe should turn ***OFF*** and the spindle should come to a quick stop.

Note: *After using the foot brake to stop the lathe, it is necessary to move the spindle ON/OFF lever to the OFF position before attempting to re-start spindle rotation.*

17. Point the cutting fluid nozzle down into the chip tray, use the cutting fluid switch on the control panel to start the pump, then open the valve on the nozzle. Verify that the cutting fluid flows from the nozzle and properly recycles to the cutting fluid reservoir, then turn the pump ***OFF***.

Congratulations! The test run is complete. Continue with the **Spindle Break-In** and **Recommended Adjustments** procedures on the next page.

NOTICE

During the first 16 hours of use, the V-belts will stretch and seat into the pulley grooves. The V-belts must be properly re-tensioned after this period to avoid reducing their useful life. Refer to V-Belts Service on Page 83 for detailed instructions.

Spindle Break-In

Before subjecting the lathe to full loads, you must break it in. This procedure will fully seat the bearings, allow the gear teeth to find their normal wear pattern, and enable the lubricant to be worked into the required areas.

To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 23**.

2. To ensure the carriage components do not unexpectedly move when the lathe is started, rotate the headstock feed direction knob so that the arrow points to middle (neutral) position (see **Figure 23**).

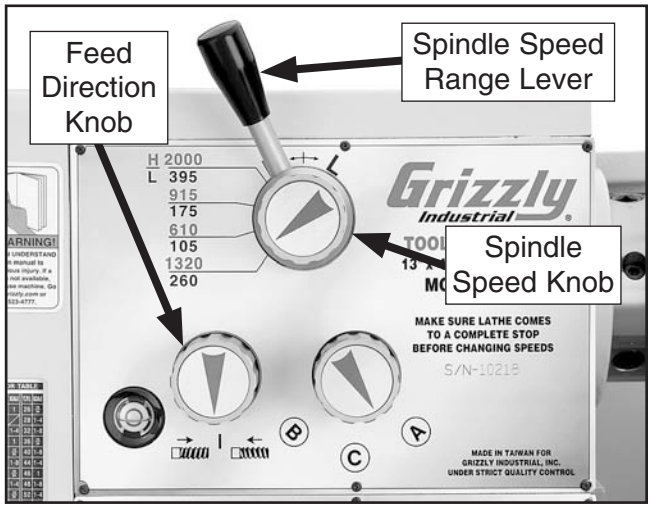


Figure 23. Headstock controls.

3. Move the spindle speed range lever to the low (right) position, and rotate the spindle speed knob so that the arrow points to the spindle speed of 105 RPM (refer to **Setting Spindle Speed** on **Page 51** for addition details).

NOTICE

Do not leave the lathe unattended during the Spindle Break-In procedure. If your attention is needed elsewhere during this procedure, stop the lathe and restart the procedure from the beginning at a later time when you can devote your full time and attention to it.

4. Take all safety precautions, run the lathe for 10 minutes, then turn the lathe ***OFF*** and wait until the spindle is completely stopped.

5. Repeat **Step 4** for the remaining 7 spindle speeds.

6. Set the spindle speed to 260 RPM and let the lathe run for a final 15 minutes to allow it to cool down, then turn the lathe ***OFF***.

NOTICE

Change the oil in the headstock, quick change gearbox, and apron reservoirs as instructed in *Lubrication* beginning on *Page 64*. This will flush away any metal particles that may have accumulated from the manufacturing process or the spindle break-in.

7. Check and, if necessary, re-tension the V-belts as instructed in **V-Belt Service** on **Page 83**.

The spindle break-in is complete. Continue with the following **Recommend Adjustments** section.

Recommended Adjustments

The following adjustments have been made at the factory. However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from the lathe.

Factory adjustments that should be verified:

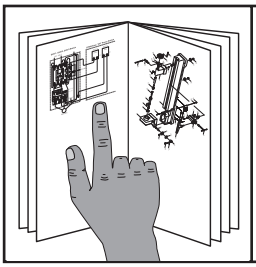
- Tailstock alignment (refer to **Page 44**)
- Compound and cross slide backlash (refer to **Page 80**)
- Gib adjustments (refer to **Page 78**).

SECTION 4: OPERATIONS

Operation Overview

The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so the machine controls/components discussed later in this manual are easier to understand.

Due to the generic nature of this overview, it is **not** intended to be an instructional guide. To learn more about specific operations, read this entire manual and seek additional training from experienced machine operators, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.

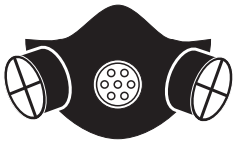


⚠WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before operating.

⚠WARNING

Damage to your eyes and lungs could result from using this machine without proper protective gear. Always wear safety glasses and a respirator when operating this machine.



NOTICE

If you have never used this type of machine or equipment before, WE STRONGLY RECOMMEND that you read books, review industry trade magazines, or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

To complete a typical operation, the operator does the following:

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.

2. Examines the workpiece to make sure it is suitable for turning, then mounts the workpiece in one of the chucks (or on faceplate), and removes the chuck key from the chuck.

3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.

4. Removes all setup tools from the lathe.

5. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.

6. Moves slides and rests to where they will be used during operation.

7. Sets the correct spindle speed for the operation.

8. If using power feed, selects the proper feed rate for the operation.

9. Turns the master power switch ***ON***, resets the emergency STOP button, then moves the spindle ON/OFF lever down to start spindle rotation.

10. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.

11. When finished cutting, moves the spindle lever to the OFF position, waits until the spindle is completely stopped, then removes the workpiece.

Controls & Components

Refer to **Figures 24–30** and the following descriptions to become familiar with the location and function of the basic controls for this lathe.

Master Power Switch: This switch toggles power to the lathe controls, motor, and cutting fluid pump.

Dial Indicator Stud (Model G9730 Only): Enables a dial indicator to be used for precise measurements of carriage position.

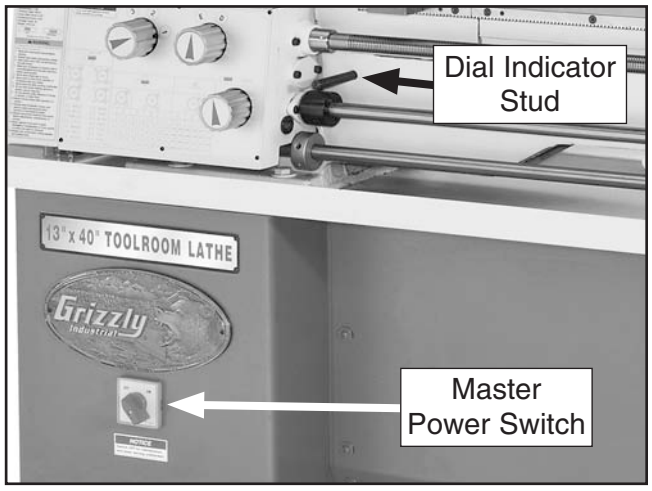


Figure 24. Location of the master power switch.

Headstock Controls

Figure 25. Headstock controls.

A. Spindle Speed Range Lever: Selects the high or low spindle speed ranges.

B. Spindle Speed Knob: Selects one of the four speeds available in the spindle speed range selected.

C. Headstock Feed Direction Knob: Changes the rotation direction of the leadscrew or feedrod to change the direction of carriage movement.

D. Quick Change Knob A–C: Changes the speed of power transfer from the headstock gears to the lower quick change gears.

Control Panel

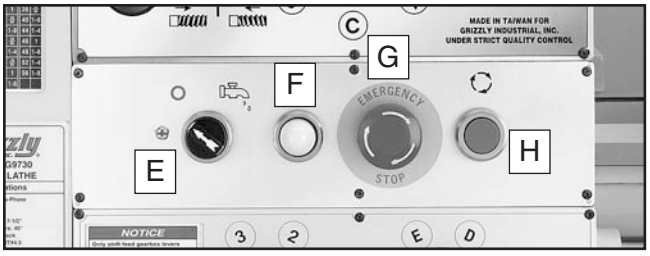


Figure 26. Control panel components.

E. Cutting Fluid Switch: Controls the operation of the cutting fluid pump.

F. Power Light: Illuminates when the master power switch is turned ***ON***.

G. Emergency STOP Button: When pressed, stops the flow of power to the lathe. Turn it clockwise until it pops out to re-establish power flow.

H. Jog Button: Rotates the spindle counter-clockwise while it is pressed.

Quick Change Controls

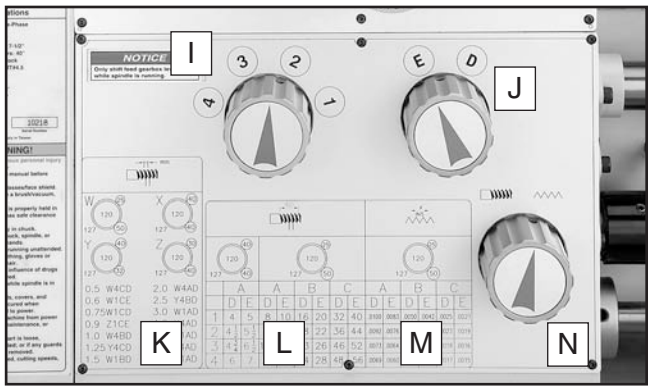


Figure 27. Quick change controls.

I. Quick Change Knob 1–4: Changes gear ratios inside the quick change gearbox.

J. Quick Change Knob D–E: Changes gear ratios inside the quick change gearbox.

K. Metric Thread Chart: Displays the positions of the change gears and quick change controls for metric threading operations.

L. Inch Thread Chart: Displays the positions of the change gears and quick change controls for metric threading operations.

M. Feed Rate Chart: Displays the positions of the change gears and quick change controls for the available feed rates.

N. Feed Selection Knob: Selects the leadscrew or the feedrod for power feed operations.

Carriage Controls

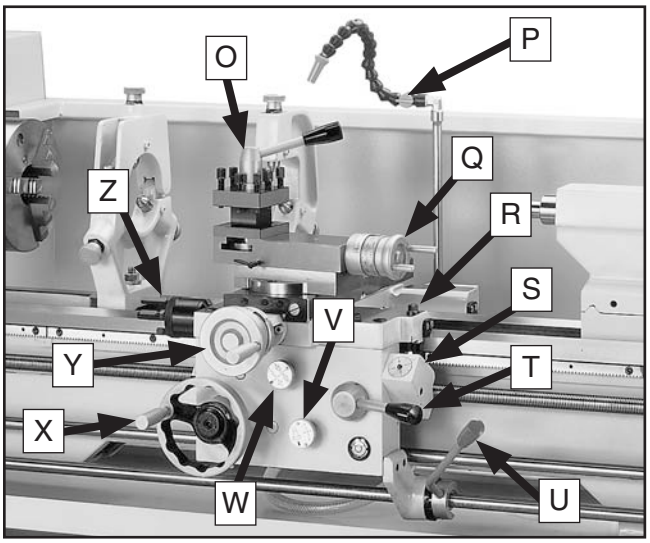


Figure 28. Carriage controls.

O. 4-Way Tool Post: Holds four cutting tools and rotates to index a particular tool to the workpiece.

P. Cutting Fluid Nozzle and Valve: Delivers cutting fluid to the cutting operation. The valve controls the amount of flow.

Q. Compound Rest Handwheel: Moves the compound rest when rotated. The attached direct-read graduated dial has 0.001" increments, with one revolution equaling 0.100" of movement.

R. Carriage Lock: When tightened, locks the carriage to the bed.

S. Thread Dial: Indicates when to engage the halfnut with the leadscrew for inch threading operations.

T. Halfnut Lever: Engages/disengages the halfnut with the leadscrew when threading.

U. Spindle ON/OFF Lever: Starts, stops, and reverses spindle rotation.

V. Feed ON/OFF Knob: Engages/disengages the carriage with the feedrod.

W. Feed Selector Knob: When the carriage is engaged with the feedrod, selects carriage longitudinal travel or cross slide travel.

X. Carriage Handwheel: Moves the carriage left or right along the bedway. The attached graduated dial has 0.005" increments, with one revolution equaling 0.625" of movement.

Y. Cross Slide Handwheel: Moves the cross slide in or out perpendicular to the spindle centerline. The attached indirect-read graduated dial has 0.001" increments, with one revolution equaling 0.200" of movement.

Z. 4-Position Carriage Stop: When the carriage is engaged with the feedrod, stops carriage movement by forcing the feedrod clutch to slip. Generally used for repetitive operations.

Tailstock Controls

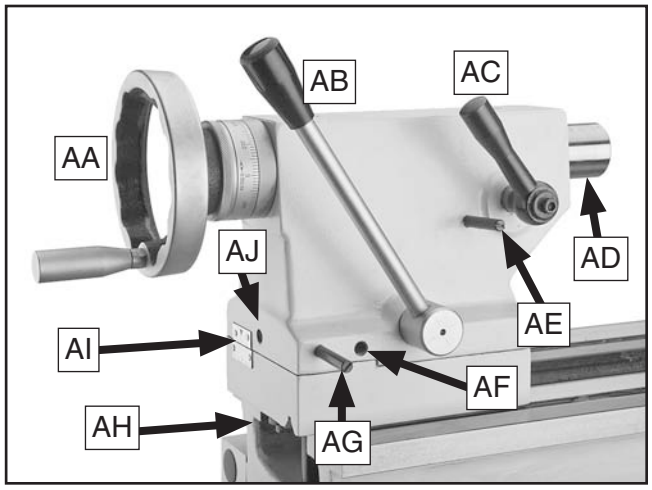


Figure 29. Tailstock controls.

AA. Quill Handwheel: Moves the quill in or out from the tailstock casting. The attached graduated dial has 0.001" increments, with one revolution equaling 0.100" of movement.

AB. Tailstock Lock Lever: Locks the tailstock assembly in place on the bedway.

AC. Quill Lock Lever: Locks the quill in position.

AD. Quill: Accepts tools with MT#3 tapers and has increments in inches and millimeters marked on the barrel.

AE. Quill Lock Lever Rest: Prevents the quill lock lever from causing an obstruction when loose.

AF. Offset Adjustment Screw: Adjusts the top tailstock casting offset (1 of 2).

AG. Tailstock Lock Lever Rest: Prevents the tailstock lock lever from causing an obstruction when loose.

AH. Casting Clamp Screw: One of two cap screws that clamp the top and bottom tailstock castings together. These cap screws must be loosened when adjusting the offset.

AI. Offset Scale: Shows the relative offset of the top and bottom casting. For precise measurements, use an indicator.

AJ. Locking Set Screw: When tightened, keeps the top and bottom castings aligned with each other.

Foot Brake

This lathe is equipped with a foot brake (see **Figure 30**) to quickly stop the spindle. Pushing the foot brake while the spindle is ***ON*** cuts power to the motor and stops the spindle.

When the foot brake is used, the power lamp shows that the lathe is still energized, but the circuit to the spindle motor is interrupted. Once stopped, the spindle lever needs to be returned to the middle (OFF) position to reset the spindle switches.

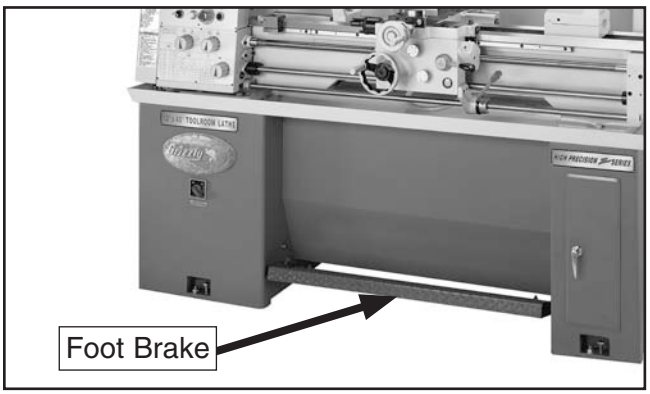


Figure 30. Location of the foot brake.

Chuck & Faceplate Mounting

This lathe is shipped with the 3-jaw chuck installed. This is a scroll-type chuck where all three jaws move in unison when the chuck key is used.

The included 4-jaw chuck features independent jaws, which are used for square or unevenly-shaped stock, and to mount work that needs to be adjusted to near-zero total indicated runout.

If neither chuck can properly hold your workpiece, the cast-iron faceplate has slots that hold standard or custom clamping hardware. With the correct clamping hardware, this faceplate will hold non-cylindrical parts.

The chucks and faceplate have a D1-4 camlock mount. A chuck key is used to turn the locking cams to secure or release the chuck or faceplate.

Tools Needed	Qty
Dead Blow Hammer or Wood Block	1
Chuck Cradle or Plywood ¾"	1
Chuck Key	1

Removing Chuck or Faceplate

1. DISCONNECT LATHE FROM POWER!

2. Lay a chuck cradle (see **Figure 31**) or plywood under the chuck or faceplate and over the bedway to protect the precision ground surfaces from damage and reduce injury if fingers get pinched.

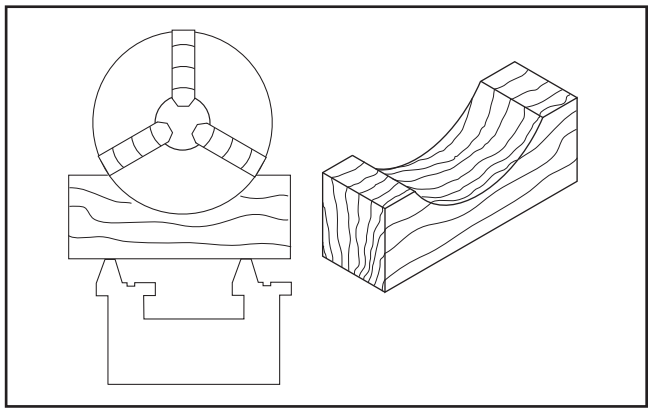


Figure 31. Wooden chuck cradle.

3. Use the chuck key to turn the first camlock counterclockwise until the cam line is between the right "V" mark and the cam release datum line, as shown in **Figure 32**.

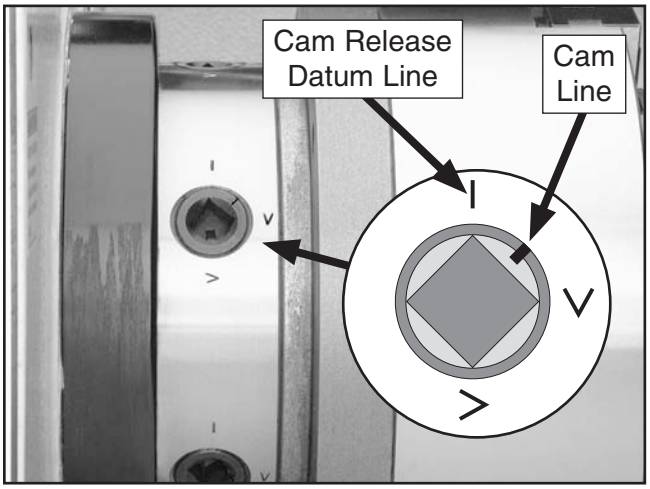


Figure 32. Camlock loosened counterclockwise halfway.

4. Repeat **Step 3** in an alternating star pattern around the spindle until all of the camlocks are in the same position. This ensures that the chuck or faceplate will disengage from the spindle evenly.

   Note: *The camlocks will slightly rise up from the spindle body as they are rotated.*

5. Start with the same camlock you began with in **Step 3** and rotate it counterclockwise so that the cam line is aligned with the cam release datum line, as illustrated in **Figure 33**.

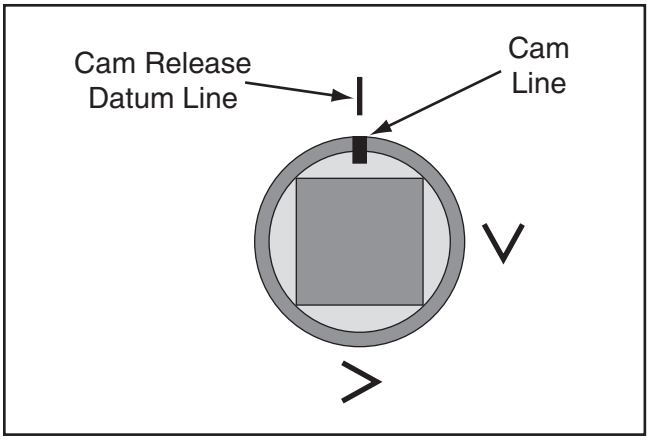


Figure 33. Cam line aligned with the cam release datum line.

6. While supporting the chuck or faceplate, rotate the remaining camlocks in the same alternating star pattern you used in **Step 4** to align the cam and datum lines. This will fully disengage the chuck or faceplate from the spindle.

7. Remove the chuck key, continue supporting the chuck or faceplate, then use the dead blow hammer or a wood block to lightly tap around the circumference of the chuck or faceplate until it breaks free from the spindle taper and camlock sockets.

8. With a rocking motion, carefully remove the chuck or faceplate from the spindle nose, as shown in the example of **Figure 34**.

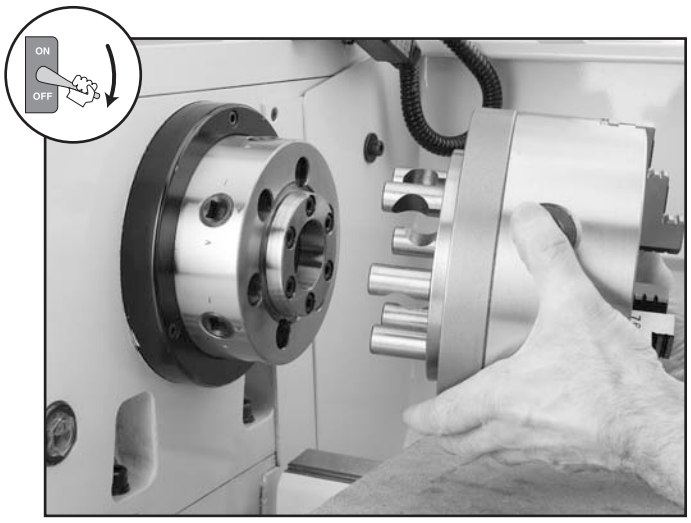


Figure 34. Removing a chuck from the spindle nose.

Installing & Adjusting Camlock Studs

Each camlock stud must extend from the back of the chuck or faceplate the correct length and position to ensure the camlock will fully engage the stud. Achieving this often requires a process of trial-and-error.

Tip: *When the camlock studs are correctly installed and adjusted, and the chuck or faceplate mounts evenly onto the spindle, make opposing and unique matching registration marks on the sides of the spindle and chuck/faceplate. Align these registration marks when you next mount the chuck or faceplate to ensure that the correct spindle mounting hole is used by each stud.*

Tool Needed	**Qty**
Hex Wrench 5mm	1

To install or adjust camlock studs into a chuck or faceplate:

1. Lay the chuck or faceplate upside down on a protective, flat surface.

2. If installed, remove the locking cap screws adjacent to each of the three camlock mounting holes (see **Figure 35** for an example).

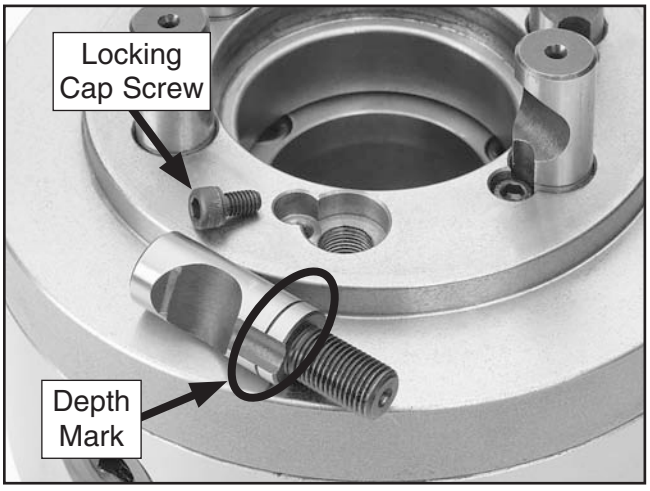


Figure 35. Camlock depth mark and locking cap screw.

3. Thread each camlock stud into the chuck or faceplate until the depth mark on the stud (see **Figure 35**) is even with the surface of the chuck or faceplate and the curved indent of the side of the stud faces the locking cap screw hole, as illustrated in **Figure 36**. This is an initial adjustment.

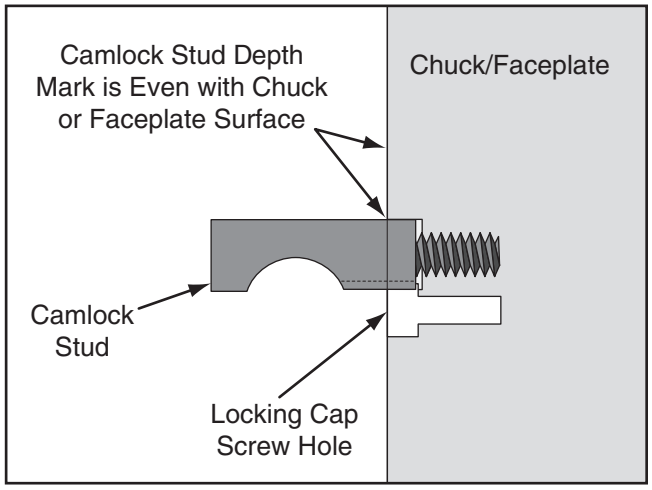


Figure 36. Initial position adjustment of the camlock stud.

4. Install and fully thread the locking cap screws. Make sure that the camlock studs can rotate slightly back-and-forth against the head of the locking screw (see **Figure 37**).

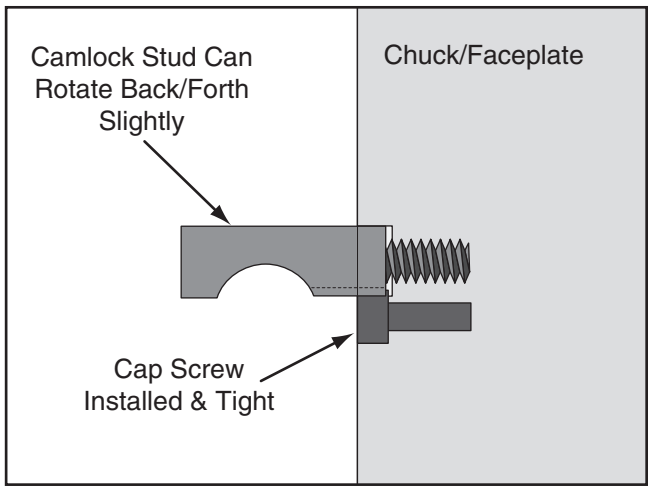


Figure 37. Camlock stud and locking cap screw correctly installed.

5. Install the chuck or faceplate onto the spindle and tighten the camlocks, as instructed in **Mounting Chuck or Faceplate** on **Page 34**. However, for this procedure fully tighten the camlocks in the second pass until they stop.

—If the cam line stops midway between the "V" marks, the camlock stud is correctly adjusted.

—If the cam line stops before the first "V" mark, the stud needs to be adjusted out by turning it counterclockwise one full turn (see **Figure 38**).

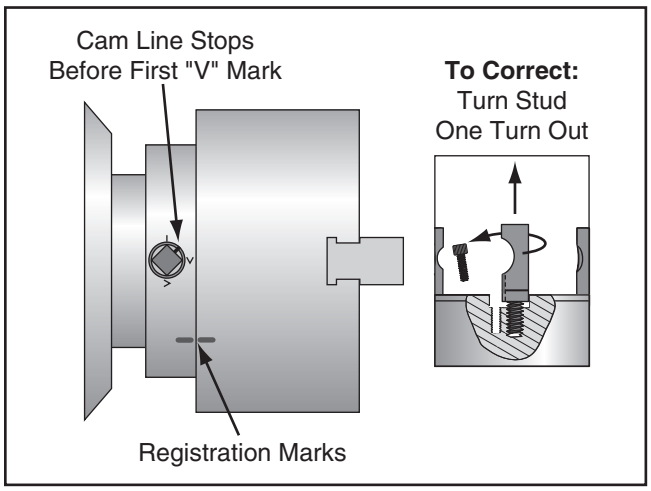


Figure 38. Adjusting the camlock stud out.

—If the cam line stops after the second "V" mark, the stud needs to be adjusted in by turning it clockwise one full turn (see **Figure 39**).

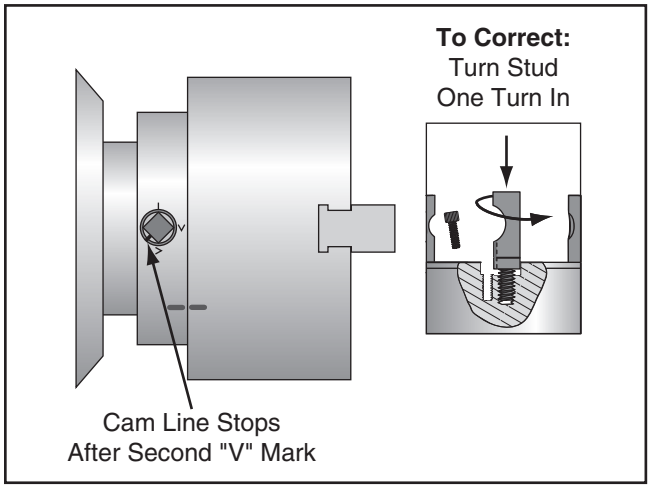


Figure 39. Adjusting the camlock stud in.

6. When you are satisfied that all the camlock studs are properly adjusted, mount the chuck or faceplate onto the spindle, then make opposing and unique registration marks for that chuck or faceplate.

Mounting Chuck or Faceplate

1. DISCONNECT LATHE FROM POWER!

2. Lay a chuck cradle (see **Figure 31** on the previous page) or plywood under the chuck or faceplate and over the bedway to protect the precision-ground surfaces from damage and reduce injury if fingers get pinched.

3. Clean away debris and oily substances from the mating surfaces of the spindle and chuck or faceplate to prevent them from seizing together under operational pressure.

4. Inspect and make sure that all the camlock studs are undamaged and clean, and that the camlock stud cap screws are in place and snug (see **Installing & Adjusting Camlock Studs** on **Page 32** for additional information).

NOTICE

Never install a chuck or faceplate without having the stud locking cap screws in place or fully tightened. If the cap screws are loose, the camlock studs could rotate with the camlocks, which could make the removal of the chuck or faceplate nearly impossible.

5. Make sure all of the cam lines on the side of the spindle are aligned with the cam release datum lines, as illustrated in **Figure 40**.

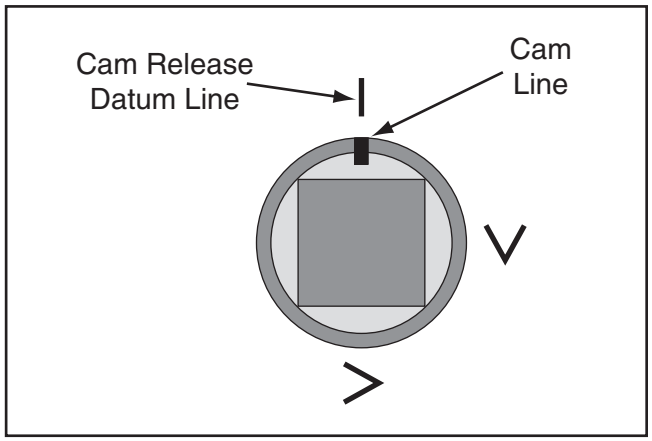


Figure 40. Cam line aligned with the cam release datum line.

Note: *If the chuck or faceplate has a registration mark that matches one on the spindle nose, align these marks when performing the next step.*

6. Insert the camlock studs into the spindle mounting holes, then hold the chuck or faceplate firmly against the spindle during the next step.

7. Rotate one camlock clockwise so that the cam line is halfway between the datum line and the right-hand "V", as illustrated in **Figure 41**.

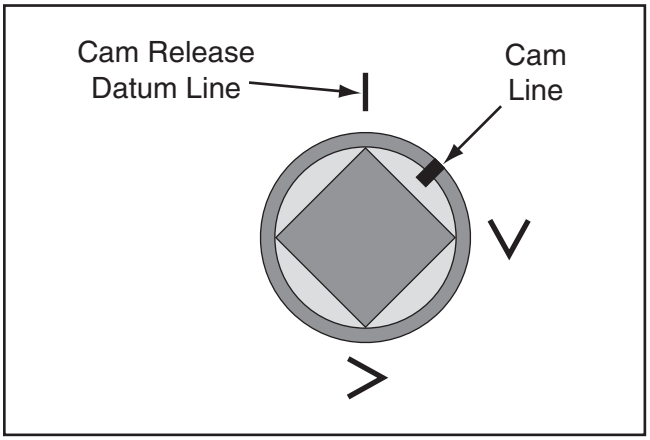


Figure 41. Camlock rotated clockwise halfway to first "V" mark.

8. Repeat **Step 7** in an alternating star pattern around the spindle until all the camlocks are in the same position. This will pull the chuck or faceplate into the spindle evenly.

9. Rotate the camlock clockwise that you started with in **Step 7** until the cam line is halfway between the "V" marks, as shown in **Figure 42**.

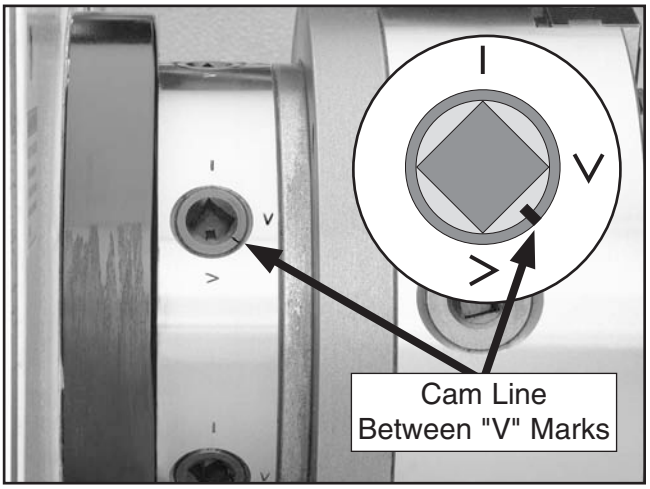


Figure 42. Camlock fully tightened with the cam line between the "V" marks.

10. In the same pattern used in **Step 7**, rotate the remaining camlocks clockwise to bring the cam lines to the same position. This will snug the chuck or faceplate up to the spindle.

Note: *If any of the cam lines do not fall between the "V" marks when the camlock is tight, you must adjust that camlock stud as instructed in* ***Installing & Adjusting Camlock Studs*** *on* ***Page 32****.*

3-Jaw Chuck

Refer to **Mounting Chuck or Faceplate** on **Page 34** to mount the 3-jaw chuck to the spindle.

The 3-jaw scroll type chuck included with the lathe features hardened steel jaws that move in unison to center a concentric workpiece.

There are two jaw sets provided—inside and outside (see **Figure 43**). The outside set holds the workpiece from the outside diameter, and the inside set centers the workpiece from the wall of an interior cavity.

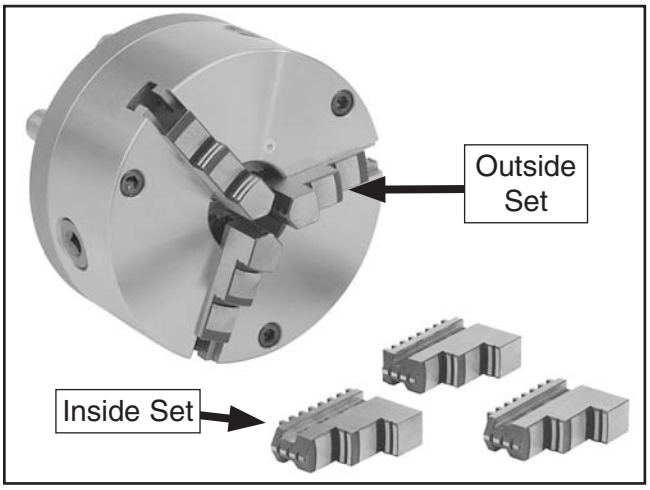


Figure 43. Jaw sets for the 3-jaw chuck.

Changing Jaw Set

Items Needed	Qty
3-Jaw Chuck Key	1
Plywood ¾"	1
White Lithium Grease	As Needed

To change the jaw set:

1. DISCONNECT LATHE FROM POWER!

2. Place a piece of plywood over the bedways to protect them from potential damage.

3. Insert the chuck key and turn it counterclockwise to back the jaws out and remove them.

Make sure to hold each jaw in turn until you can remove it to prevent damage to the machined surfaces.

4. Use mineral spirits to clean the debris and grime from the jaws and the chuck jaw guides.

5. Apply a thin coat of white lithium grease to the surfaces of the removed jaw set, then store them in a safe place free from moisture and abrasives.

   Note: *The jaws are numbered from 1–3 and are designed to be installed in this order so that they will hold the concentric workpiece evenly.*

6. Rotate the chuck key clockwise until you see the tip of the scroll gear lead thread begin to enter a jaw guide (see **Figure 44**).

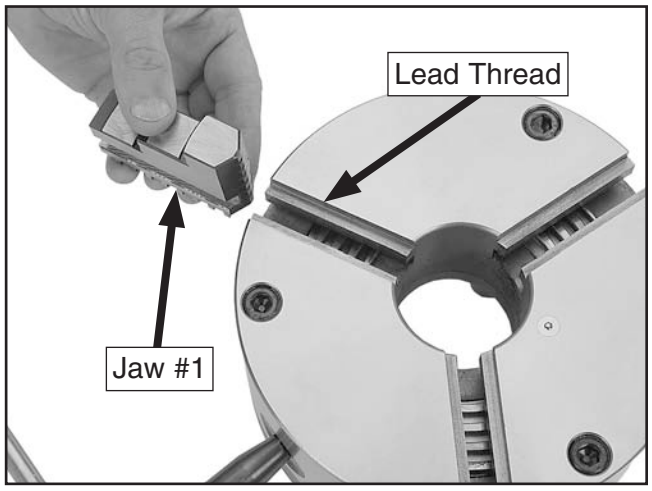


Figure 44. Inserting jaw #1 into the jaw guide.

7. Insert jaw #1 into the jaw guide and hold it against the lead thread, then rotate the chuck key clockwise one full turn to engage the tip of the lead thread with the jaw.

   Pull on the jaw—it should be locked into the jaw guide.

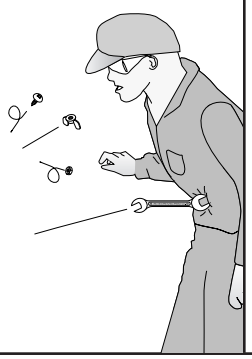
   —If the jaw comes loose when you pull on it, rotate the chuck key counterclockwise to back the scroll gear lead thread out of the jaw guide, then repeat **Steps 6–7**.

8. Repeat **Steps 6–7** with jaw #2, then jaw #3.

9. Rotate the chuck key clockwise until all the jaws come together in the center.

   —If the jaws meet evenly in the center of the chuck, they are installed properly.

   —If all the jaws do not come together evenly then remove them and repeat this procedure until they do.



⚠WARNING

Securely mount the workpiece and remove the chuck key before connecting the lathe to power! Objects thrown from the lathe could cause death or serious personal injury to the operator or bystanders many feet away.

Mounting Workpiece

Items Needed	Qty
3-Jaw Chuck Key	1
Chuck Cradle or Plywood ¾"	1

To mount a workpiece in the 3-jaw chuck:

1. DISCONNECT LATHE FROM POWER!

2. Place a chuck cradle or piece of plywood on the bedways below the chuck or faceplate to protect the bedway surfaces.

3. Open the jaws until the workpiece fits flat on the chuck face, the jaw steps, or into the spindle opening.

4. With the help from another person or a supporting device to hold the workpiece in position, tighten the jaws until they make even contact with the workpiece and it is centered. See **Figure 45** for examples of mounting a workpiece on a 3-jaw chuck.

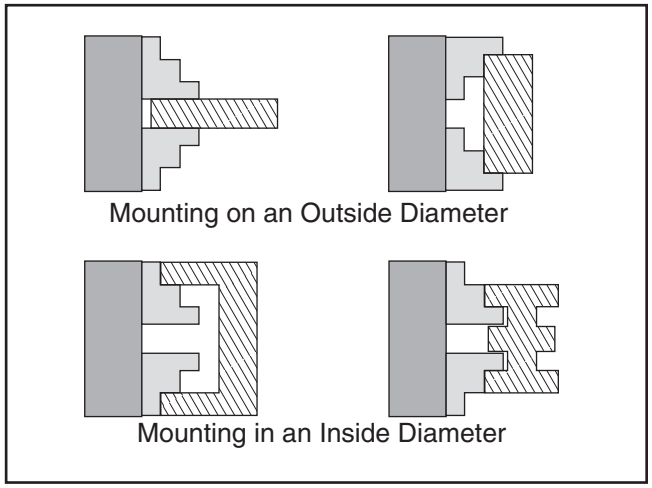


Figure 45. Examples of workpiece mounting options for a 3-jaw chuck.

5. Rotate the chuck by hand to make sure the workpiece makes even contact with all three jaws and spins evenly without any visible wobble or interference.

   —If the workpiece is not held evenly or is off-center, repeat **Steps 3–5** until it is mounted properly.

6. After verifying that the workpiece is properly centered, fully tighten the jaws to make sure the workpiece is held securely so that it will not come loose during operation.

⚠WARNING

Because of the dynamic forces involved in machining a non-concentric or off-center workpiece, always use a low spindle speed to prevent the workpiece breaking loose and being thrown from the lathe, which could lead to death or serious personal injury.

4-Jaw Chuck

Refer to **Mounting Chuck or Faceplate** on **Page 34** to mount the 4-jaw chuck to the spindle.

The 4-jaw chuck features independently adjustable hardened steel jaws for holding non-concentric or off-center workpieces. Each jaw can be removed from the chuck body and reversed for a wide range of work holding versatility.

Mounting Workpiece

Items Needed	Qty
4-Jaw Chuck Key	1
Chuck Cradle or Plywood ¾"	1

To mount a workpiece in the 4-jaw chuck:

1. DISCONNECT LATHE FROM POWER!

2. Place a chuck cradle or piece of plywood on the bedways below the chuck or faceplate to protect the bedway surfaces.

3. Use the chuck key to open each jaw so that the workpiece will lay flat against the chuck face, jaw steps, or into the spindle opening.

4. With the help from another person or a supporting device to hold the workpiece against the chuck, center it on the chuck.

5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening each jaw in an opposing sequence until the workpiece is firmly secured (see **Figure 46**).

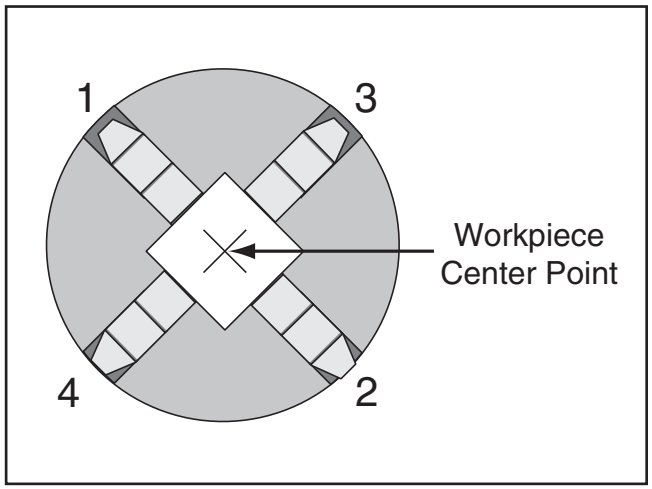


Figure 46. Jaw tightening sequence for the 4-jaw chuck.

6. After the workpiece is secured in place by the jaws, turn the chuck by hand and pay attention to the workpiece alignment.

   —If the workpiece is not correctly aligned for your operation, make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is correctly aligned (see **Figure 47** for an example).

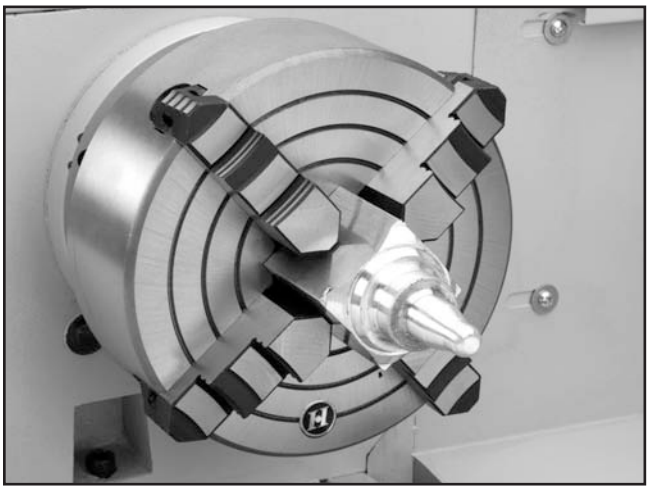


Figure 47. Generic picture of a workpiece properly mounted in a 4-jaw chuck.

Faceplate

Refer to **Mounting Chuck or Faceplate** on **Page 34** to mount the faceplate to the spindle.

The 10" faceplate included with this lathe offers a wide range of uses, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

The tools needed for mounting a workpiece will vary depending on the type of setup you have.

⚠WARNING

Failure to properly secure a workpiece to the faceplate could cause the workpiece to be thrown from the lathe with deadly force at the operator or bystanders. Use a minimum of THREE independent clamping devices to hold the workpiece, clamp counter-weights to the faceplate to balance it, and always use a low spindle speed.

To mount a non-concentric workpiece to the faceplate:

1. DISCONNECT LATHE FROM POWER!

2. Protect the bedway with a piece of plywood.

3. With the help of another person or a workpiece supporting device, position the workpiece onto the faceplate and firmly clamp it in place with a minimum of three independent clamping devices (see **Figure 48** for an example).

   Be sure to take into account the rotational and cutting forces that will be applied to the workpiece when clamping it to the faceplate. If necessary, use counter-weights to balance the assembly.

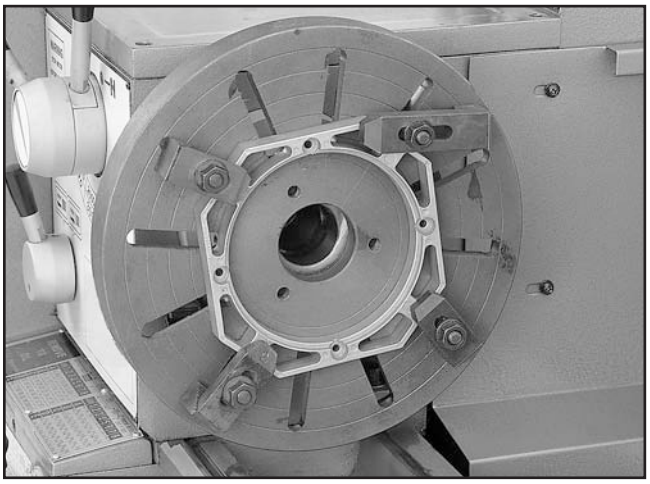


Figure 48. Generic picture of a workpiece clamped to a faceplate.

Centers

Figure 49 shows the MT#3 dead centers included with the lathe. In addition, an MT#4.5–MT#3 tapered spindle sleeve is included for mounting the centers in the spindle.

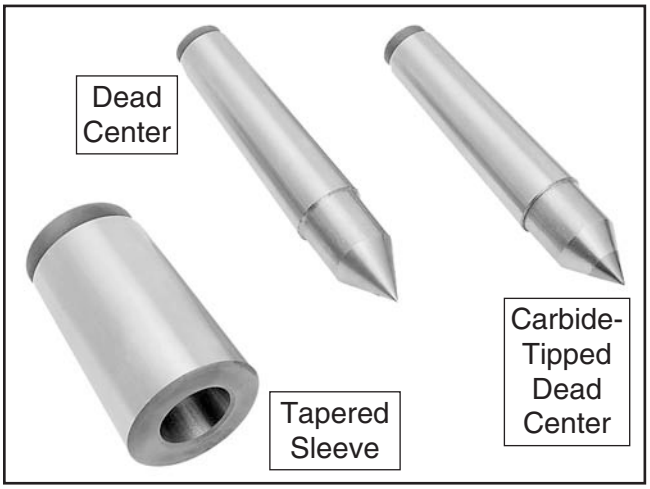


Figure 49. Tapered spindle sleeve and dead centers.

Dead Centers

The dead center achieves more accurate results than a live center, but it requires low spindle speeds and a small amount of oil to reduce friction that may damage the workpiece.

Use the dead center in the spindle, because the workpiece does not rotate on the tip and does not generate friction.

Use the carbide-tipped dead center in the tailstock where the workpiece will rotate against it and generate friction. The carbide-tipped dead center can better withstand the effects of friction; however, the tip of the center must be lubricated to avoid premature wear and maximize smooth operation. Also, using low spindle speeds will reduce the heat and wear from friction.

Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together, and can be installed in the spindle and the tailstock quill for higher speeds.

Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!

2. Thoroughly clean and dry the tapered mating surfaces of the spindle bore, tapered sleeve, and the center, making sure that no lint or oil remains on the tapers.

Note: *This will prevent the tapered surfaces seizing from operational pressures, which could make it very difficult to remove the center.*

3. Slide a lathe dog onto the workpiece with the foot pointing toward the spindle (see **Figure 50** for an example).

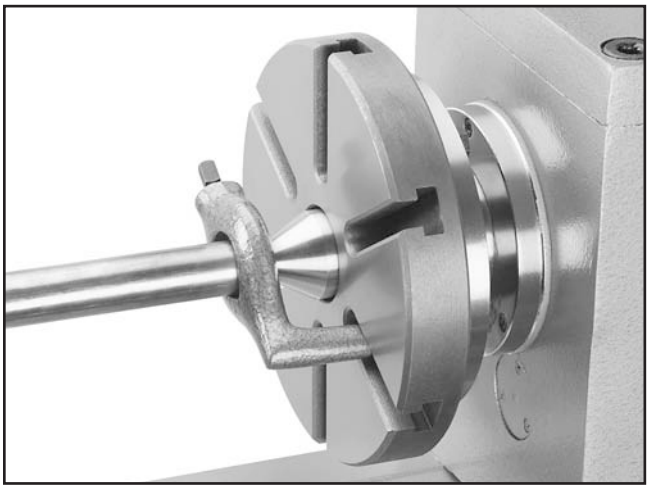


Figure 50. Generic picture of using the dead center with a faceplate and lathe dog.

4. Mount a chuck, faceplate, or the drive plate onto the spindle, whichever is correct for your operation.

Note: *The 7" drive plate included with this lathe is specifically designed for use with a dead center and lathe dog.*

5. Insert the center into the sleeve, then insert the sleeve into the spindle bore through the chuck, faceplate, or drive plate.

Removing Center From Spindle

To remove the sleeve and center from the spindle, insert a piece of round bar stock or similar tool through the outboard end (on the left side of the headstock), then tap the sleeve loose.

Hold onto the sleeve and center with a gloved hand or shop rag as you tap them loose to avoid dropping them and damaging the tip of the center or the bedways.

Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. **Figure 51** shows an example of a dead center mounted in a tailstock.

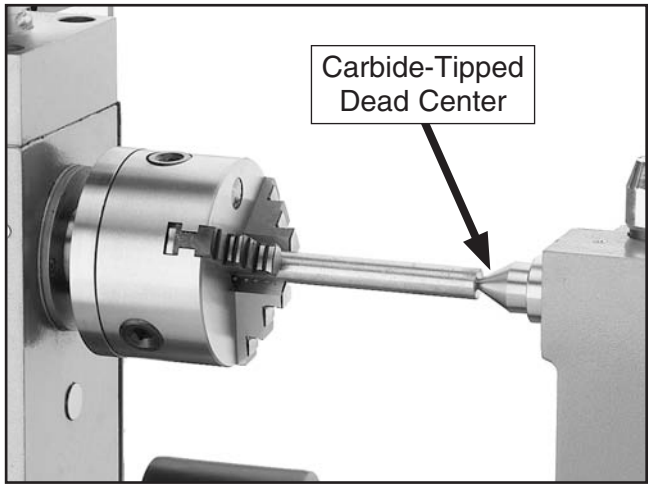


Figure 51. Generic picture of using a carbide-tipped dead center in the tailstock.

To mount a center in the tailstock:

1. DISCONNECT LATHE FROM POWER!

2. Thoroughly clean and dry the tapered mating surfaces of the tailstock quill bore and the center, making sure that no lint of oil remains that could cause the tapers to seize under operational pressures.

3. Use the tailstock handwheel to feed the quill out from the casting approximately 1".

   Note: *Keep in mind that extending the quill more than 2" will reduce stability and accuracy*

4. Insert the center into the tailstock with a quick and firm motion.

Removing Center From Tailstock

To remove the center from the tailstock quill, hold onto it with a gloved hand or shop rag, then rotate the tailstock handwheel counterclockwise to draw the quill back into the casting until the center releases.

Mounting Workpiece Between Centers

1. DISCONNECT LATHE FROM POWER!

2. Drill center holes in both ends of the workpiece.

3. Install a dead center and lathe dog into the spindle with a chuck, faceplate, or drive plate, and a live center or carbide-tipped dead center in the tailstock.

4. Secure the lathe dog on the spindle end and lubricate the workpiece center hole on the tailstock end with anti-seize oil.

5. Seat the center firmly into the quill during workpiece installation by rotating the tailstock handwheel clockwise to apply pressure against the workpiece, with the center tip engaged in the workpiece center-drilled hole (see **Figure 52** for an example).

   Only apply enough pressure to securely mount the workpiece between centers. Avoid over-tightening the center against the workpiece, or it may become difficult to remove it later. Also, over-tightening will result in excessive friction and heat, which may damage the workpiece or center.

Figure 52. Generic picture of a workpiece mounted between dead centers.

Tailstock

The tailstock (see **Figure 53**) can be used to support workpieces with the use of centers. It can also be used to drill or bore holes, or cut shallow tapers by using the offset adjustment.

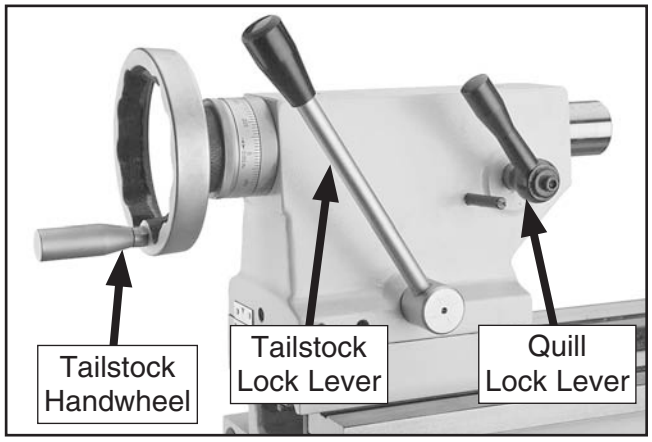


Figure 53. Tailstock and quill lock levers.

Positioning Tailstock

1. Pull the tailstock lock lever backward (away from the spindle) to unlock the tailstock from the bedway.

2. Slide the tailstock to the desired position.

3. Push the tailstock lock lever forward (toward the spindle) to lock the tailstock to the bedway.

Using Quill

Maximum Quill Travel ..... 4"
Handwheel Scale Increments ..... 0.001"
Travel w/One Handwheel Revolution ..... 0.100"

To use the quill:

1. Pull the quill lock lever back to release the quill.

2. Turn the tailstock handwheel clockwise to move the quill toward the spindle or counterclockwise to move it away from the spindle.

3. Push the quill forward toward the spindle to lock the quill in place.

Installing Tooling

The tailstock on this lathe uses a quill with an MT#3 taper that accepts tools with and without lock tangs.

The quill has a lock slot in the back of the bore that accepts tools with lock tangs (see **Figures 54–55** for examples).

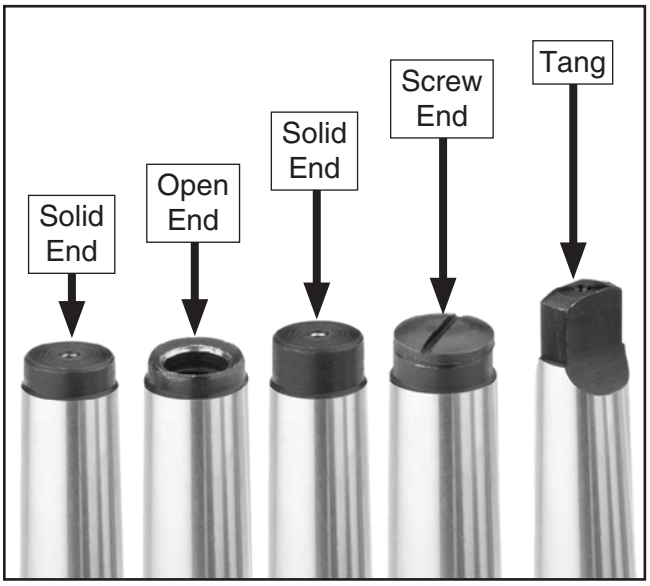


Figure 54. Examples of various tailstock arbors and tooling.

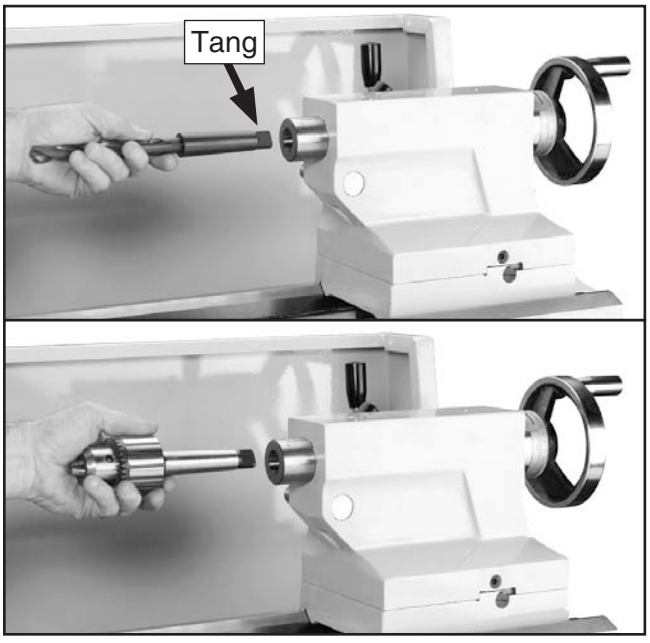


Figure 55. Examples of inserting tang end tooling into the tailstock quill.

However, other tooling without lock tangs, such as the first four tools shown in **Figure 53** on the previous page, can still be used if the potential load will not override the strength of the MT#3 tapered fit. For example, smaller drill chucks, drill bits, and centers.

If the tooling has an open hole but is too short to be exposed in the drift slot for removal, then a screw can be threaded into the end of the tool to provide a solid surface for the quill internal pin to push against when the quill is retracted for tool removal.

To install tailstock tooling:

1. With the tailstock locked in place, unlock the quill, then use the handwheel to extend it approximately 1".

2. Thoroughly clean and dry the tapered mating surfaces of the quill and the center, making sure that no lint or oil remains on the tapers.

   Note: *This will prevent the tapered surfaces seizing under operational pressures, which could make it very difficult to remove the tool.*

3. If the tapered tool shaft has a lock tang, align it horizontally with the indent in the back of the quill before inserting it.

4. When the tool is firmly seated in the quill, unlock the tailstock from the bedway and move it until the tip of the tool is close to, but not touching, the workpiece, then re-lock the tailstock.

5. Start spindle rotation, unlock the quill, then turn the quill handwheel clockwise to feed the tool into the workpiece.

Removing Tooling

Hold the tool with a gloved hand or shop rag, then rotate the tailstock handwheel counterclockwise to retract the quill until the tool is forced out of the quill.

If the tool does not come loose by retracting the quill, extend the quill and use a drift key in the slot shown in **Figure 56**.

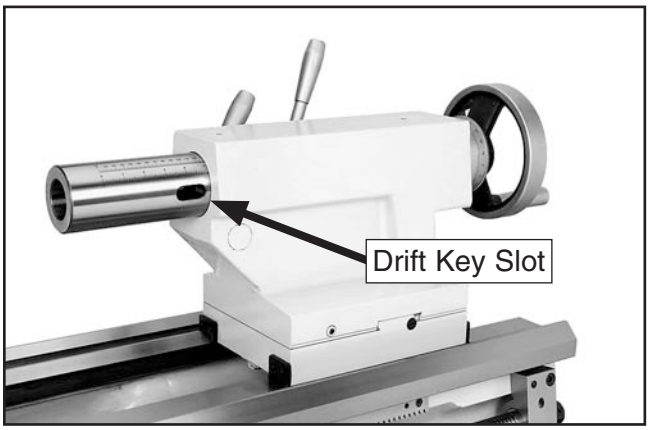


Figure 56. Location of the quill drift key slot.

Offsetting Tailstock

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the machine to produce a taper on the tailstock end. Conversely, position the tailstock top casting toward the back of the machine to produce a taper near the spindle end (see the illustrations in **Figure 57**).

Note: *The marks on the offset indicator are arbitrary. For a precise offset, use a dial indicator to check quill movement while making adjustments.*

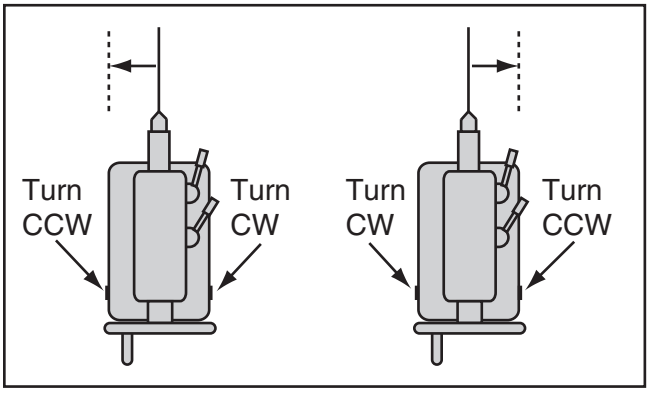


Figure 57. Set screw adjustments in relation to tailstock offset.

Tool Needed	Qty
Hex Wrench 5mm	1

To offset the tailstock:

1. Loosen the clamping cap screws underneath both ends of the tailstock (see **Figure 58**) to release the clamping pressure between the top and bottom tailstock castings.

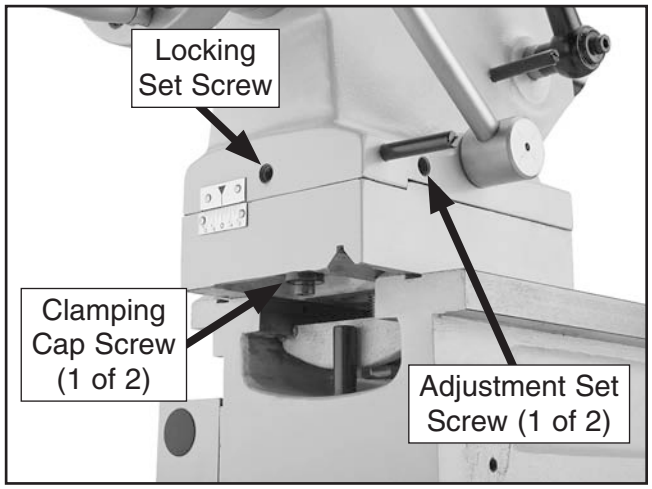


Figure 58. Tailstock offset controls.

2. Loosen the locking set screw shown in **Figure 58**.

3. Rotate the adjustment set screws the same amount in opposite directions for the desired offset, then re-tighten the locking set screw and the clamping cap screws to secure the offset setting.

Aligning To Spindle Centerline

The tailstock was aligned to the spindle centerline at the factory. However, we recommend you take the time to ensure that the tailstock is properly aligned to your specifications, especially if you have changed the offset to cut tapers.

Items Needed	Qty
Hex Wrench 5mm	1
Round Stock 2" x 6"	2
Precision Level	1

To align the tailstock to the spindle centerline:

1. Use the precision level to make sure the bedway is level from side to side and from front to back.

   —If the bedway is not level, correct this condition before continuing with this procedure (refer to **Mounting** on **Page 21** for additional information).

2. Center drill both ends of one piece of round stock, then set it aside for use in **Step 5**.

3. Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 59**.

   Note: *As long as this dead center remains in the chuck, the point of the center will remain true to the spindle centerline. The point will have to be refinished whenever the center is removed and then returned to the chuck.*

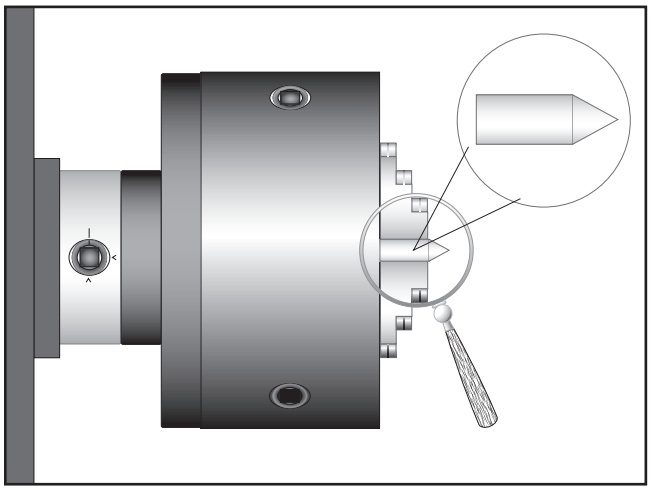


Figure 59. Turning a dead center for aligning the tailstock.

4. Install a center in the tailstock.

5. Attach a lathe dog to the test stock from **Step 2**, then mount it between the centers (see **Figure 60** for an example).

Figure 60. Generic picture of the test stock mounted between centers.

6. Turn 0.010" off the stock diameter.

7. Mount a test or dial indicator so that the plunger is on the tailstock quill.

   Note: *If necessary in the following step, refer to* ***Offsetting Tailstock*** *on* ***Page 43*** *for detailed instructions.*

8. Use calipers to measure both ends of the test stock.

   —If the test stock is *thicker* at the tailstock end, move the tailstock *toward* the operator ½ the distance of the amount of taper (see **Figure 61**.

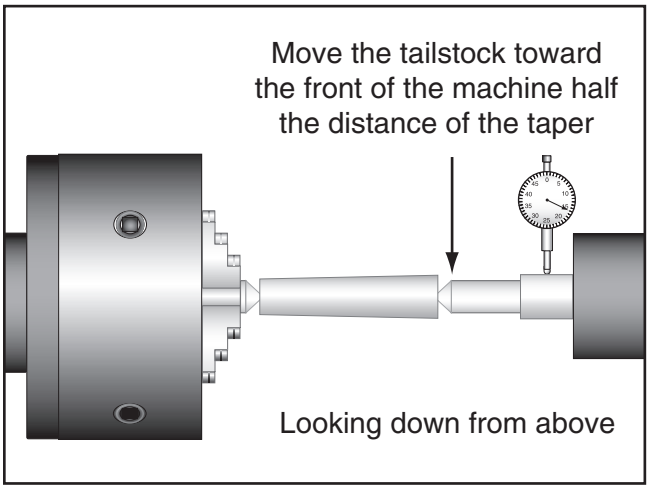


Figure 61. Adjust tailstock toward the operator.

   —If the test stock is *thinner* at the tailstock end, move the tailstock *away* from the operator ½ the distance of the amount of taper (see **Figure 62**).

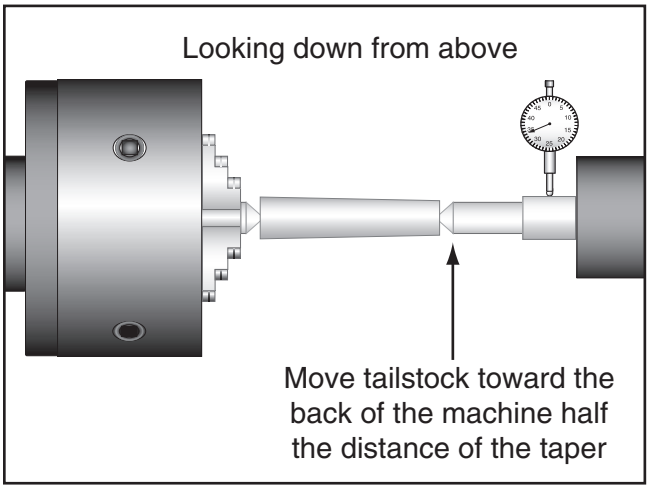


Figure 62. Adjust tailstock away from the operator.

9. Repeat **Steps 6–8** until the desired accuracy is achieved.

Steady Rest

The steady rest supports long shafts and can be mounted anywhere along the length of the bedway.

To install and use the steady rest:

1. DISCONNECT LATHE FROM POWER!

2. Thoroughly clean the machined base of the steady rest so that it will sit evenly on the bedway, then place it on the lathe bedway so that the triangle notch fits over the bedway prism (see **Figure 63**).

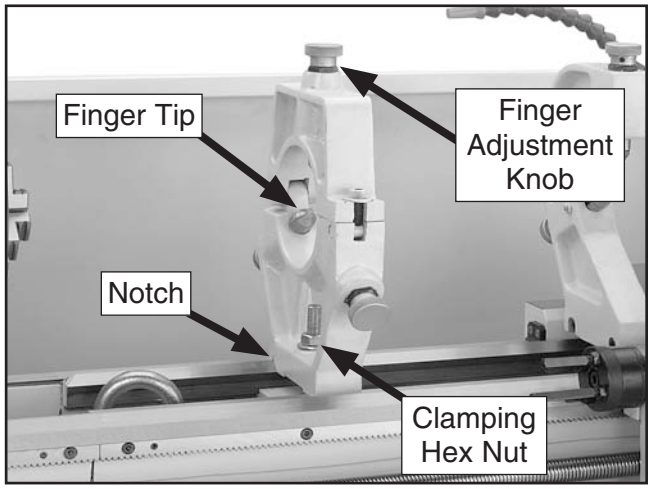


Figure 63. Steady rest controls.

3. Position the steady rest where required to properly support the workpiece, then tighten the clamping hex nut shown in **Figure 63** to secure it in place.

4. Loosen the cap screw that secures the halves of the rest, then open it.

5. Use the finger adjustment knobs to position the bottom two finger tips so that the workpiece can rest on them in a straight line with the spindle (see **Figure 64** for an example).

   Note: *To reduce the effects of friction, lubricate the brass finger tips with an anti-seize oil during operation.*

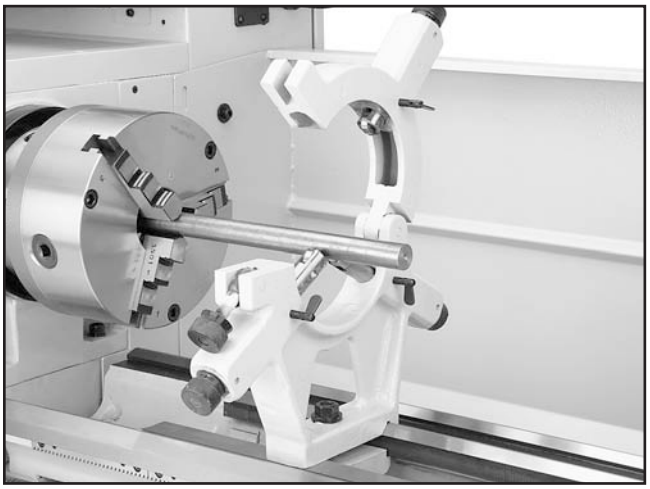


Figure 64. Generic picture of workpiece positioned in a typical steady rest.

Follow Rest

The follow rest shown in **Figure 65** mounts to the front of the saddle with two cap screws. It is used with long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the steady rest.

Note: *To reduce the effects of friction, lubricate the brass finger tips with an anti-seize oil during operation.*

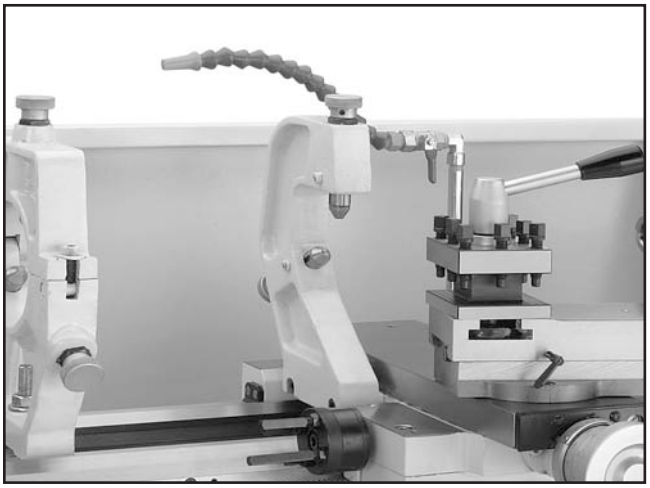


Figure 65. Follow rest.

Carriage & Slide Locks

The carriage, cross slide, and compound rest have locks that can be tightened to provide additional rigidity during operation, especially during heavy cuts (see **Figure 66** for locations).

The associated lock must be loose before moving that component.

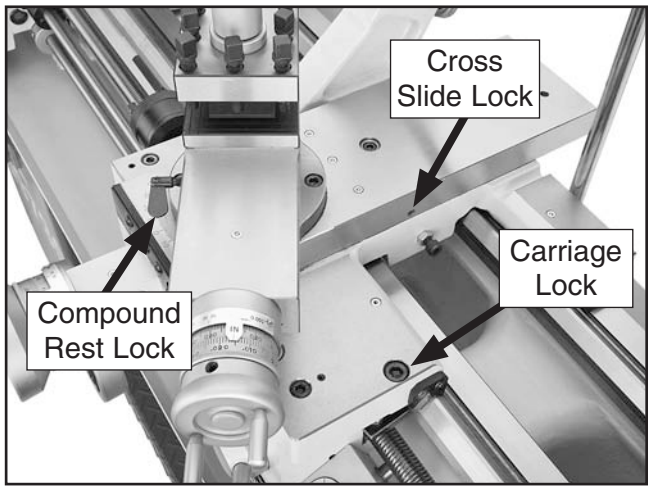


Figure 66. Location of carriage and slide locks.

Compound Rest

The compound rest handwheel has an direct-read graduated dial. This means the amount removed from the workpiece diameter is the amount shown on the dial. In front of the rest is a graduated angle scale used for positioning the tool at a specific angle to the workpiece.

Tools Needed	Qty
Hex Wrench 6mm	1

To set the compound rest at a certain angle:

1. Loosen the two cap screws on both sides of the rest (1 of 2 shown in **Figure 67**).

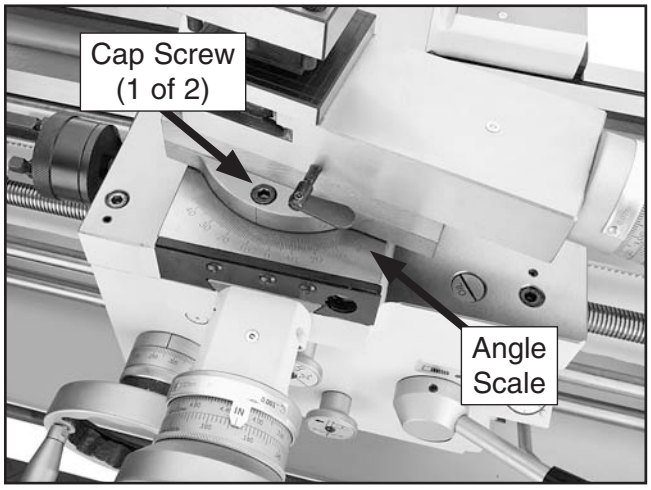


Figure 67. Compound rest angle controls.

2. Rotate the rest to the desired angle, as indicated by the angle scale, then re-tighten the two cap screws to secure the rest in place.

   Tip: *If setting up to cut external right-hand inch or metric threads, or internal left-hand threads for the first time, set the compound rest so its travel is perfectly parallel with the cross slide. Using a protractor, rotate the compound 29.5° counterclockwise and mark the new location on the cross slide. This mark will be the quick reference point for setting the offset angle. To mark for internal right-hand threads, or external left hand threads, repeat this process, but rotate the rest 29.5° clockwise and mark the cross slide accordingly.*

Four-Way Tool Post

The four-way tool post is mounted on top of the compound rest and allows a maximum of four tools to be loaded simultaneously.

The four-way tool post allows for quick indexing to different tools, which is accomplished by loosening the top handle, rotating the tool post to the desired position, then re-tightening the handle to lock the tool into position.

Installing Tool

Tool Needed	Qty
Tool Post T-Wrench	1

To load the tool post:

1. Loosen the tool post bolts so that the cutting tool can fit underneath them (see the example in **Figure 68**).

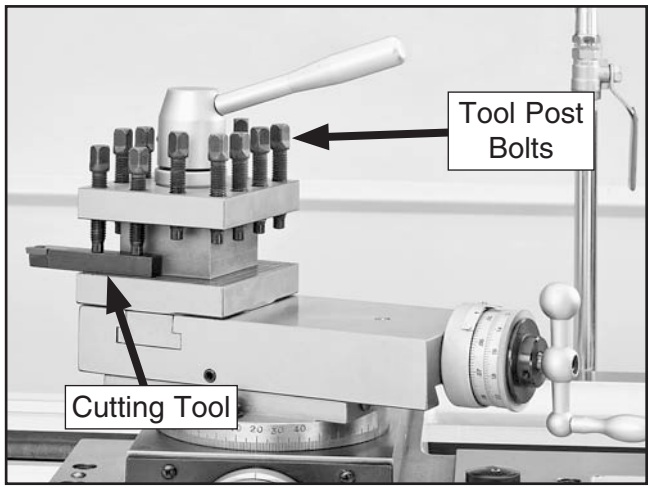


Figure 68. Example of tool mounted in a four-way tool post.

⚠WARNING

Over-extending a cutting tool from the tool post will increase the risk of it breaking during operation, which may cause metal pieces to be thrown with great force at the operator or bystanders. Only extend a cutting tool 2.5 times the width of its cross-section or less (e.g., 2.5 x 0.5" = 1.25").

2. Firmly secure the cutting tool with a least two post bolts.

3. Check and adjust the cutting tool to the spindle centerline, as instructed in the next subsection.

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned with the spindle centerline, as illustrated in **Figure 69**.

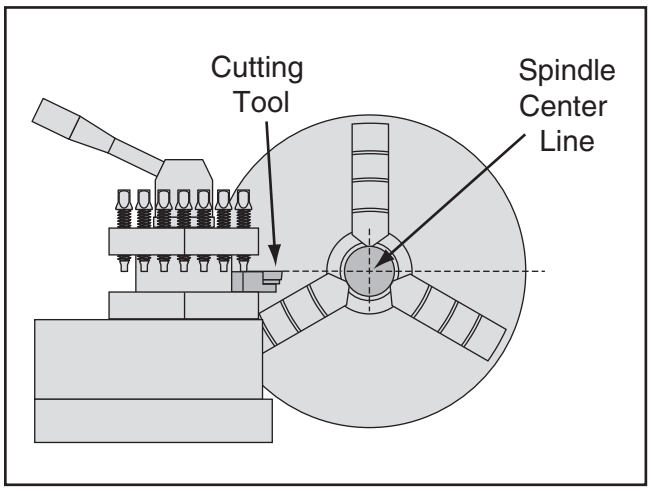


Figure 69. Cutting tool aligned with spindle centerline (viewed from tailstock).

There are a number of ways to check and align the cutting tool to the spindle centerline. If necessary, use steel shims underneath the cutting tool to raise it. The shims should be as long and as wide as the cutting tool to properly support it.

Below are two common methods:

- Align the cutting tool tip with a center installed in the tailstock, as instructed on the next page. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 44** for detailed instructions).

- Make a facing cut on a piece of round bar stock. If the tool is above or below the spindle centerline, a nub will be left in the workpiece center. Adjust the height of the tool, then repeat the facing cut to check the adjustment. Repeat this procedure as necessary until the center of the workpiece face is smooth.

Items Needed	Qty
Tool Post T-Wrench	1
Steel Shims	As Needed
Cutting Tool	1
Tailstock Center	1

To align the cutting tool with the tailstock center:

1. Mount the cutting tool in the tool post, then secure the post so that the tool faces the tailstock.

2. Install a center in the tailstock, then position the center tip near the cutting tool tip.

3. Lock the tailstock and quill in place.

4. Adjust the height of the cutting tool so that the tool tip is aligned vertically and horizontally with the center tip, as shown in **Figure 70**.

   If necessary for vertical alignment, use steel shims that are equal to the length and width of the cutting tool.

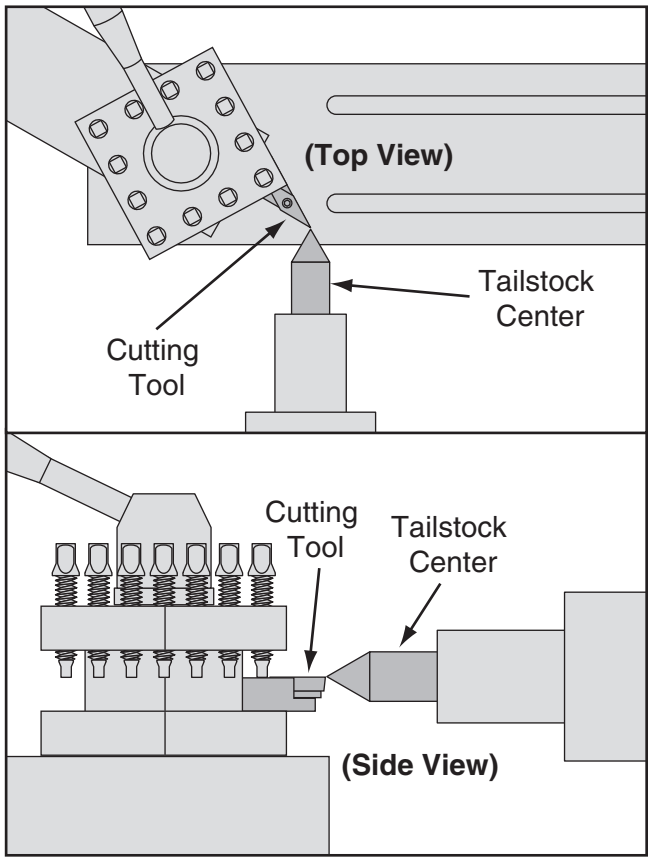


Figure 70. Cutting tool aligned to the tailstock center.

4-Position & Micrometer Carriage Stops

The 4-position and micrometer carriage stops, shown in **Figure 71**, are used to accurately position the carriage during operation. The knurled knob of the micrometer stop fine tunes the extension of the stop rod, and the 4-position stop provides four different stop positions. This is very useful when cutting shoulders, spacing grooves, or facing work to length.

Typically, power feed is used to bring the carriage stops together within approximately 1/16", then the handwheel is used for the remaining distance.

When the carriage is engaged with the feedrod, the feedrod clutch will slip and stop carriage movement when the two stops meet. However, keep in mind that using the feedrod clutch in this manner increases wear on the feedrod and carriage components.

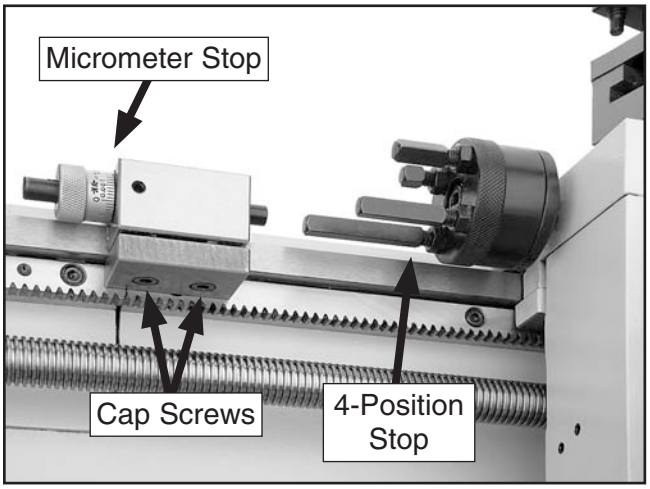


Figure 71. Micrometer and 4-position carriage stops.

NOTICE

When the carriage is engaged with the leadscrew during threading operations, these stops WILL NOT stop carriage movement—you MUST use the halfnut lever instead. Otherwise, the carriage can crash into the chuck or the leadscrew shear pin can break.

Before doing any threading operations, make sure the carriage stops WILL NOT meet during the operation.

Tools Needed	Qty
Hex Wrench 5mm	1
Wrench 13mm	1

To setup the carriage stops:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the two cap screws underneath the micrometer stop (see **Figure 71**), position it as needed along the bedway, then re-tighten the cap screws.

3. Use the carriage handwheel to move the carriage near the micrometer stop.

4. Adjust the carriage position, the 4-position post, and the micrometer rod so that the stops will meet in the desired position to stop carriage movement.

   Use the knurled knob on the micrometer stop to fine tune how much the rod extends from the stop body.

   Back off the hex nut at the base of the 4-position stop post, then rotate the post to adjust its position, then re-tighten the hex nut.

5. Use the carriage handwheel to test the setting and, if necessary, re-adjust the micrometer stop rod and the 4-position posts.

Manual Feed

You can manually move the cutting tool around the lathe for facing or turning operations by using the handwheels shown in **Figure 72** and described below.

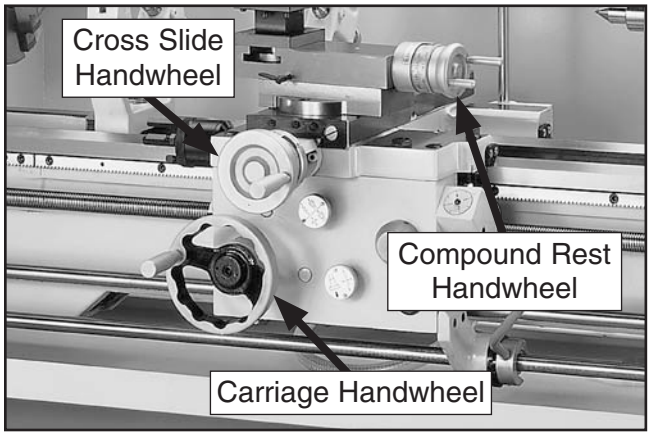


Figure 72. Carriage handwheel controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. The graduated dial has 0.005" increments, and one full revolution moves the carriage 0.650".

Cross Slide Handwheel

The cross slide handwheel moves the tool toward and away from the work. Adjust the position of the graduated dial by holding the handwheel with one hand and turning the dial with the other. This slide has an indirect graduated dial, which means the amount removed from the diameter of the workpiece is twice the amount read on the dial. The dial has 0.001" or 0.02mm increments, and one full revolution moves the slide 0.200" or 5.02mm.

Compound Rest Handwheel

The compound rest handwheel controls the position of the cutting tool relative to the workpiece. The rest has a direct graduated dial, which means the amount removed from the workpiece diameter is the amount read on the dial. The dial has 0.001" or 0.02mm increments, and one full revolution moves the rest 0.100" or 2.52mm.

Spindle Speed

Using the correct spindle speed is important for safe and satisfactory results, as well as maximizing tool life.

To set the spindle speed for your operation, you will need to: 1) Determine the best spindle speed for the cutting task, and 2) configure the lathe controls to produce the required spindle speed.

Determining Spindle Speed

Many variables dictate the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 73**.

$$\frac{{}^{*}\text{Recommended Cutting Speed (FPM)} \times 12}{\text{Dia. of Cut (in inches)} \times 3.14} = \text{Spindle Speed (RPM)}$$

*Double if using carbide cutting tool

Figure 73. Spindle speed formula for lathes.

Cutting speed, typically defined in feet per minute (FPM), is the speed at which the edge of a tool moves across the material surface.

A recommend cutting speed is an ideal speed for cutting a type of material in order to produce the desired finish and optimize tool life.

The books **Machinery's Handbook** or **Machine Shop Practice**, and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed. These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.

Also, there are a large number of easy-to-use spindle speed calculators that can be found on the internet. All of these sources will help you take into account all the applicable variables in order to determine the best spindle speed for the operation.

Setting Spindle Speed

Selecting one of the eight spindle speed available is a combination of configuring the spindle speed range lever and the spindle speed knob shown in **Figure 74**.

Figure 74. Controls used for setting the spindle speed.

The spindle speed range lever and the spindle speed knob control the gear configuration in the headstock to produce the selected spindle speed.

When the spindle speed range lever is positioned in the high position (to the left), the speeds displayed above the lines to the left of the lever are available. When the lever is rotated to the low position (to the right), the speeds below the lines are available.

The spindle speed knob is rotated so that it points to one of the four lines to the left of it, which selects the spindle speed in the range selected.

NOTICE

If the spindle is rotating when attempting to change the spindle speed, the headstock gears will suffer damage! ALWAYS make sure the spindle is completely stopped BEFORE using the headstock controls to make changes.

Configuration Examples

Using the controls on the lathe, follow along with these two examples of setting the spindle speed to gain a better understanding of this procedure.

Example 1: Spindle Speed of 1320 RPM

1. Make sure the spindle is completely stopped and the emergency STOP button is pressed in.

2. Move the spindle speed range to the high position (to the left), as illustrated in **Figure 75**.

   Note: *When adjusting the spindle speed range lever or speed knob, you may need to rock the chuck/faceplate back-and-forth by hand. If necessary, insert the chuck key for better leverage.*

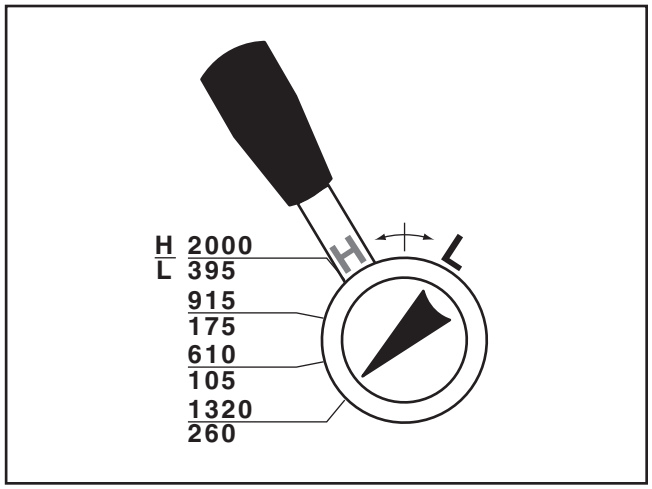


Figure 75. Spindle speed of 1320 RPM selected.

3. Rotate the spindle speed knob so that the arrow points to the line on the left that displays 1320 above the line.

The lathe is now set for a spindle speed of 1320 RPM.

Example 1: Spindle Speed of 175 RPM

1. Make sure the spindle is completely stopped and the emergency STOP button is pressed in.

2. Move the spindle speed range to the low position (to the right), as illustrated in **Figure 76**.

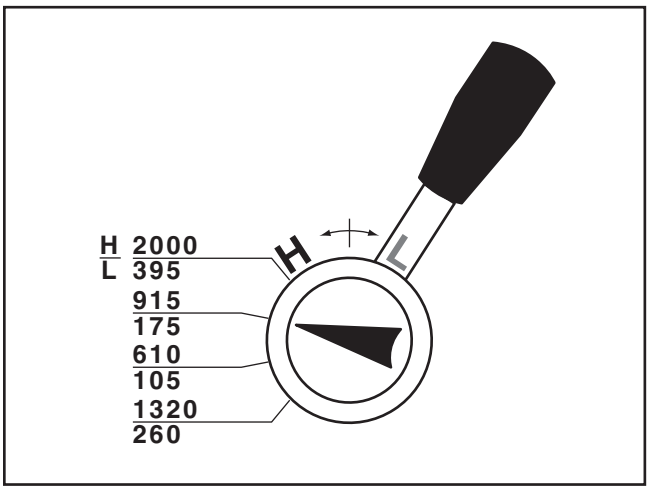


Figure 76. Spindle speed of 175 RPM selected.

3. Rotate the spindle speed knob so that the arrow points to the line on the left that displays 175 below the line.

The lathe is now set for a spindle speed of 175 RPM.

Power Feed

On this lathe, both the carriage and cross slide have power feed capability when engaged with the feedrod. The rate that these components move (feed rate) is controlled with the headstock and quick change gearbox controls.

Feed rate and spindle speed must be considered together. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed rate to use with that spindle speed.

Often, the experienced machinist will use the feeds and speeds given in their reference charts or web calculators as a starting point, then make minor adjustments to the feed rate (and sometimes the spindle speed) to achieve the best results.

The carriage can alternately be driven by the leadscrew for threading operations. However, this section covers the use of the power feed option for the carriage and cross slide components when they are engaged with the feedrod for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 56**.

NOTICE

Even though there is a lock-out device in the apron to prevent the feed control knob and the halfnut lever from being engaged at the same time, this device could break with enough force. Attempting to engage feed control knob and the halfnut lever at the same time could cause severe lathe damage and will void the warranty.

If you attempt to use the controls on the headstock above the control panel to make changes when the spindle is rotating, the headstock gearing will suffer damage! ALWAYS make sure the spindle is completely stopped BEFORE using the headstock controls to make changes.

Power Feed Controls

Refer to **Figures 77–78** and the following descriptions to become familiar with the locations and functions of the controls you will use to set up the correct power feed for your operation.

Important: *Before engaging power feed, make sure the carriage and slide locks are loose to prevent damage to these components.*

Note: *Before using power feed, you may have to re-configure the change gears, depending on how they are set up. Refer to* ***Change Gears*** *on* ***Page 57*** *for detailed instructions.*

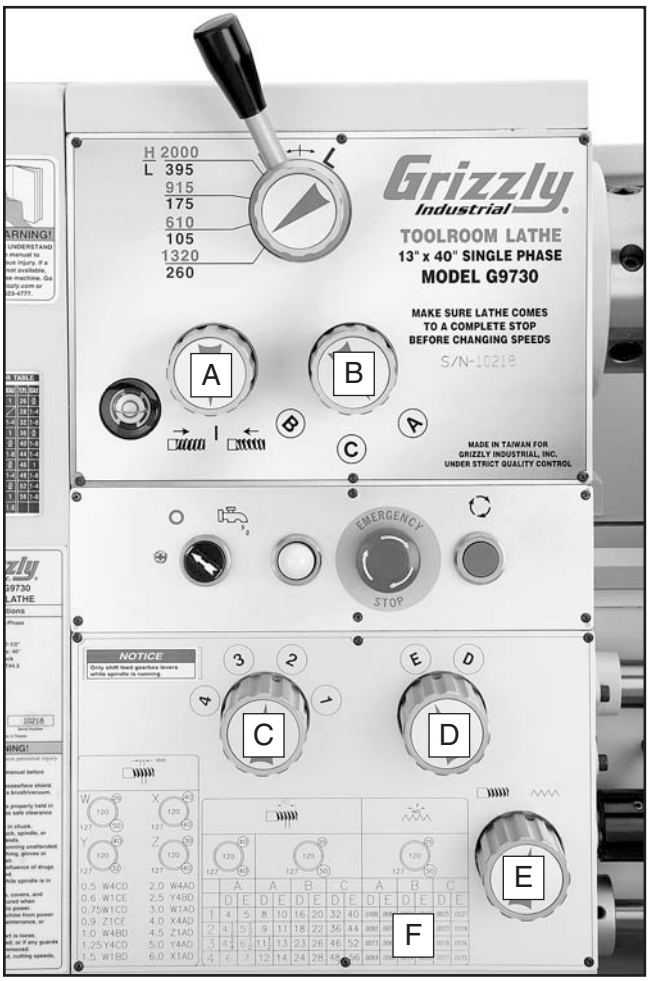


Figure 77. Power feed controls on headstock and quick change gearbox.

A. Headstock Feed Direction Knob: Changes the rotation of the feedrod to change the direction of carriage travel.

B. Quick Change Knob A–C: Changes the speed of power transfer from the headstock gears to the lower quick change gears.

C. Quick Change Knob 1–4: Changes gear ratios inside the quick change gearbox.

D. Quick Change Knob D–E: Changes gear ratios inside the quick change gearbox.

E. Feed Selection Knob: Selects the leadscrew or feedrod for power feed operations.

F. Feed Rate Chart: Displays the positions of the change gears and quick change controls for the available feed rates.

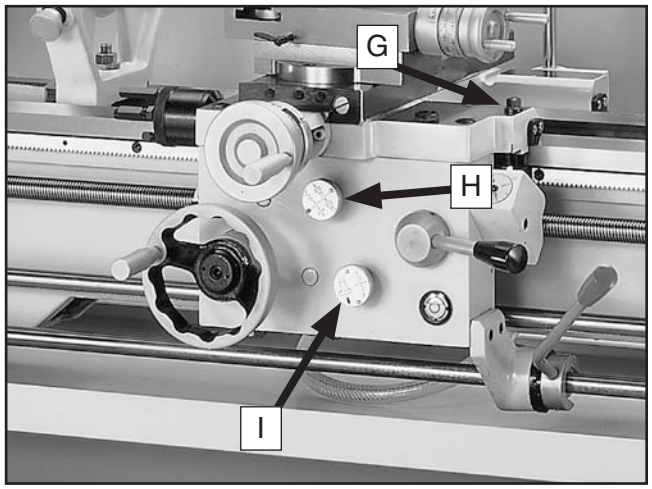


Figure 78. Power feed controls on the apron.

G. Carriage Lock: When tightened, locks the carriage to the bedway for greater rigidity. Loosen this lock before attempting to move the carriage.

H. Feed Control Knob: When the carriage is engaged with the feedrod, selects either carriage longitudinal travel or cross slide travel.

I. Feed ON/OFF Knob: Engages and disengages the carriage with the feedrod.

NOTICE

Keep in mind that if spindle rotation is reversed, the power feed direction will also reverse. Always be aware of the actual direction of power feed before beginning the cutting operation.

Setting Non-Threading Feed Rate

The feed rate chart on the lower right of the headstock face displays the configurations of the change gears and controls required for the available feed rates.

Using the controls on the lathe, follow along with the example below to better understand how to set up the lathe for the desired power feed rate.

Example: Power Feed Rate of 0.0046 in/rev

1. Make sure the change gears are in the configuration displayed at the top of the feed rate chart and illustrated in **Figure 79** (refer to **Change Gears** on the next page for detailed instructions).

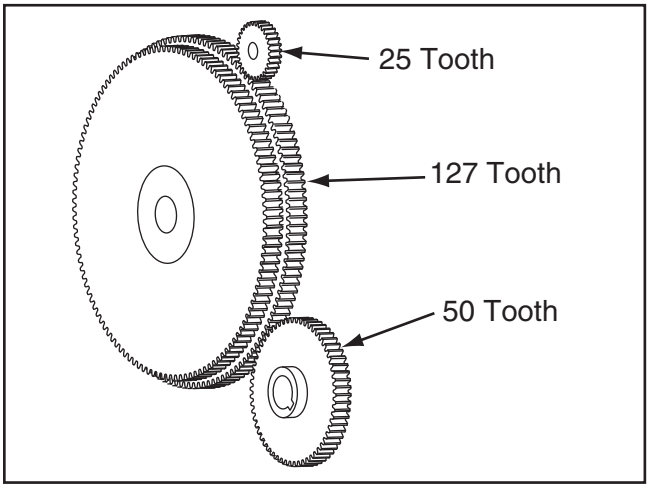
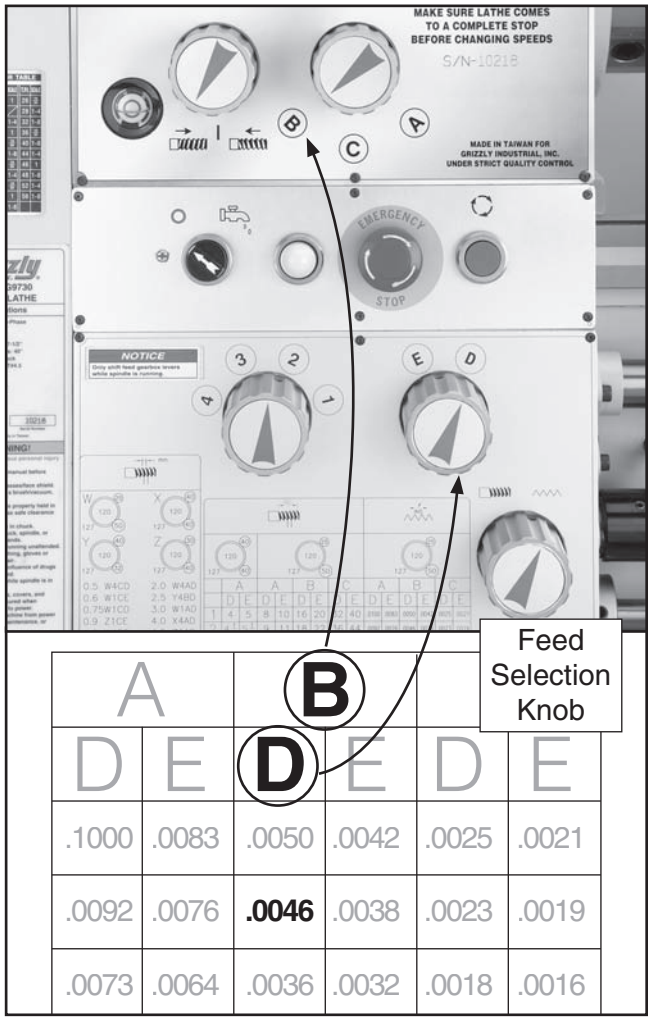


Figure 79. Change gears set up for non-threading power feed.

2. Make sure the spindle is completely stopped and the emergency STOP button is pressed in.

3. Locate the box in the feed rate chart that shows a feed rate of 0.0046 inches of feed per revolution of the spindle (see the bold characters in **Figure 80**).


MAKE SURE LATHE COMES TO A COMPLETE STOP BEFORE CHANGING SPEEDS
S/N-10218
MADE IN TAIWAN FOR GRIZZLY INDUSTRIAL, INC. UNDER STRICT QUALITY CONTROL
EMERGENCY
STOP
NOTICE
Feed Selection Knob

A		B			
D	E	D	E	D	E
.1000	.0083	.0050	.0042	.0025	.0021
.0092	.0076	**.0046**	.0038	.0023	.0019
.0073	.0064	.0036	.0032	.0018	.0016

Figure 80. Feed rate chart with a feed rate of 0.0046 in bold.

4. As instructed in the feed rate chart, rotate the quick change knob A-C to "B" and the quick change knob D–E to "D".

   Note: *When rotating these knobs, you may need to rock the chuck/faceplate back-and-forth by hand. If necessary, insert the chuck key for better leverage.*

5. Rotate the feed selection knob to the right to choose the feedrod for powered movement.

The lathe is now set up for a power feed rate of 0.0046 inches per revolution of the spindle.

Change Gears

The change gears transfer power from the headstock to the quick change gearbox. When these gears are arranged according to the threading and feed rate charts on the front of the headstock, they change the revolution speed received by the quick change gearbox for these operations.

Tools Needed	**Qty**
Hex Wrench 5mm	1
Wrench or Socket 17mm	1

To exchange change gears:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock left cover to access the change gears (see **Figure 81**).

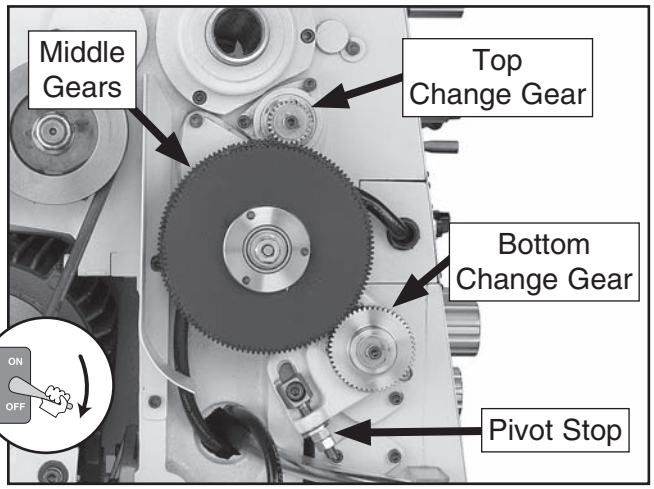


Figure 81. Change gear components.

3. Loosen the hex nuts on the pivot stop and the middle gears so that you can move the middle gears away from the top and bottom change gears.

Note: *In the following step, take care to keep the shaft keys in place during the change gear exchanges.*

4. Remove the cap screws, lock washers, and flat washers that secure the top and bottom change gears, install the correct gears as directed by the threading or feed rate charts, then secure them in place with the removed fasteners. To prevent binding the gears, do not over-tighten the cap screws—they merely hold the gears in place.

   Note: *The top change gear engages the larger 127 tooth middle gear for all applications. However, the bottom change gear engages the 127 tooth middle gear for all applications except metric threading operations. In this case, the bottom change gear needs to be reversed so that it will engage the smaller 120 tooth middle gear (see **Figure 82** for an illustrated example).*

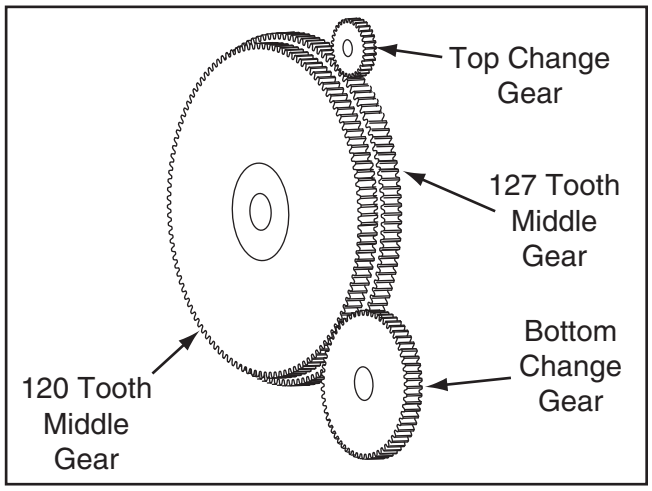


Figure 82. Example of change gears setup for metric threading.

5. Move the middle gears back in contact with the top and bottom change gears so that there is approximately 0.002" of play as they mesh, then re-tighten the pivot stop and middle gear hex nuts.

   Do not over-tighten these hex nuts—they merely hold the components in place.

6. Replace the headstock cover before re-connecting the lathe to power.

Threading

The following procedures describe how to use the threading controls and charts to set up this lathe for a threading operation. If you are unfamiliar with the process of cutting threads on a lathe, we strongly recommend that you read books, review industry trade magazines, or get formal training before attempting any threading projects.

Setting Threading Controls

The threading charts on the headstock face display the change gear and control setting for metric and inch threading.

Using the controls on the lathe, follow along with the example below to better understand how to set up the lathe for the desired threading operation.

Example: Inch Thread Pitch of 11 TPI

1. DISCONNECT LATHE FROM POWER!

2. Locate "11" in the inch threading chart on the face of the headstock (see **Figure 83**).

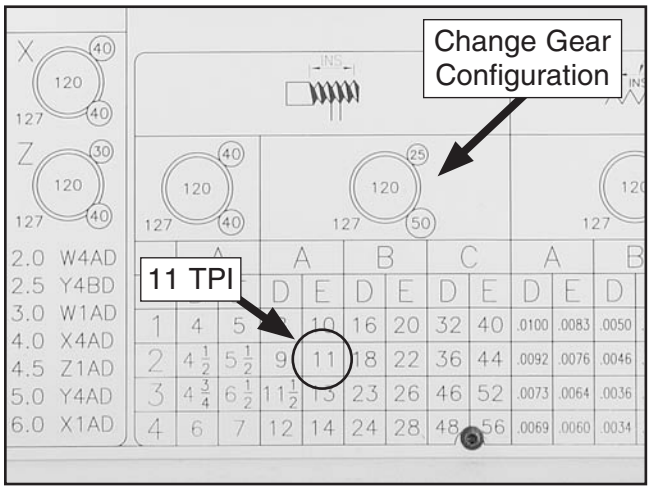


Figure 83. Setup configuration displayed on the inch threading chart for cutting threads of 11 TPI.

3. Configure the change gears as directed in the illustration above the "11" location.

4. Set the quick change knobs as shown in **Figure 84**.

   Note: *Keep in mind the spindle must be completely stopped before using the quick change knob A–C on the headstock.*

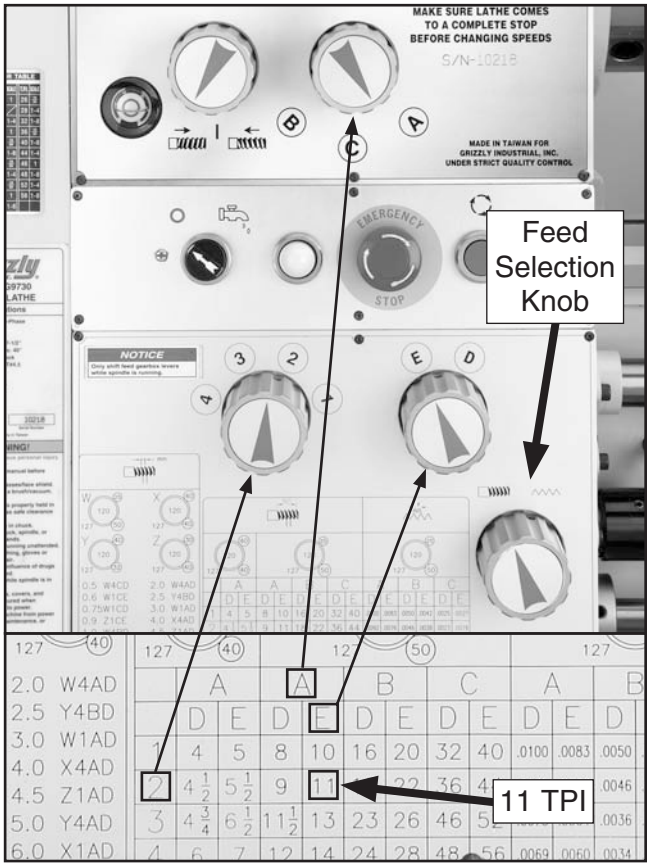


Figure 84. Quick change knobs configured for 11 TPI threading.

5. Rotate the feed selection knob on the quick change gearbox to the left to select the leadscrew for powered movement.

Halfnut Lever

The halfnut lever engages the carriage with the leadscrew which moves the cutting tool along the length of the workpiece for threading operations (see **Figure 85**).

Before attempting to push the halfnut lever down to engage the halfnut with the leadscrew, always make sure the feed ON/OFF knob is pushed in so that the carriage is not engaged with the feedrod.

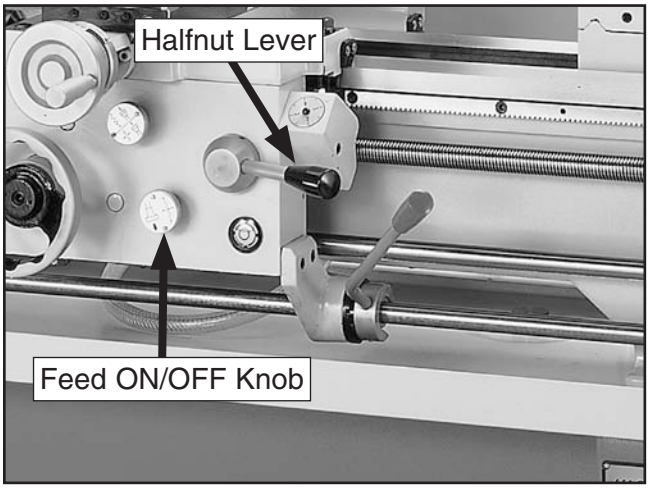


Figure 85. Location of the halfnut lever.

NOTICE

Even though there is a lock-out device in the apron to prevent the feed control knob and the halfnut lever from being engaged at the same time, this lock-out device could break with enough force. If you attempt to engage the feed control knob and the halfnut lever at the same time, severe lathe damage could result and will void the warranty.

Thread Dial

The numbers on the thread dial are used with the thread indicator table (on the headstock left cover) to show when to engage the halfnut during inch threading. This will ensure that the tool tip will enter the same thread groove on each successive pass. Otherwise, the threads will be damaged.

The thread dial gear must be engaged with the leadscrew for this to work. Loosen the cap screw shown in **Figure 86**, then pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads, then re-tighten the cap screw.

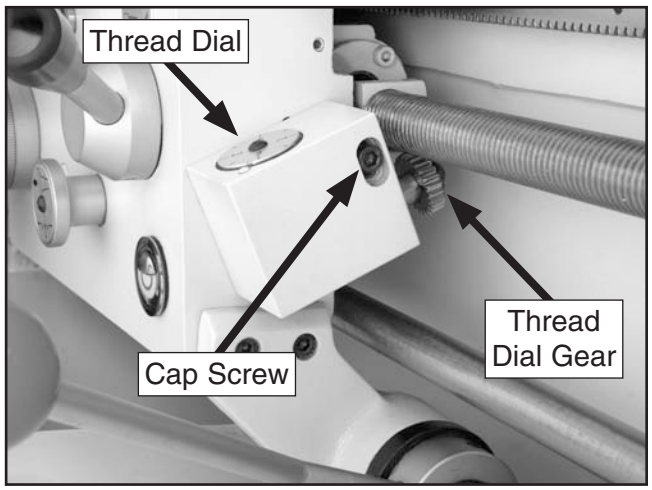


Figure 86. Thread dial gear engaged with the leadscrew.

NOTICE

When threading, we recommend you use the slowest speed possible and make multiple light cuts. This will give you better control of when to engage/disengage the halfnut and prevent damaging the workpiece or lathe.

Thread Indicator Table

The thread indicator table is located on the headstock left cover (see **Figure 87**).

Figure 87. Thread indicator table.

Find the TPI (threads per inch) that you want to cut in the left columns (under **T.P.I.**), then reference the dial number in the right columns (under **SCALE**). The dial number indicates when to engage the halfnut for a specific thread pitch as indicated by the thread dial (see **Figure 88**).

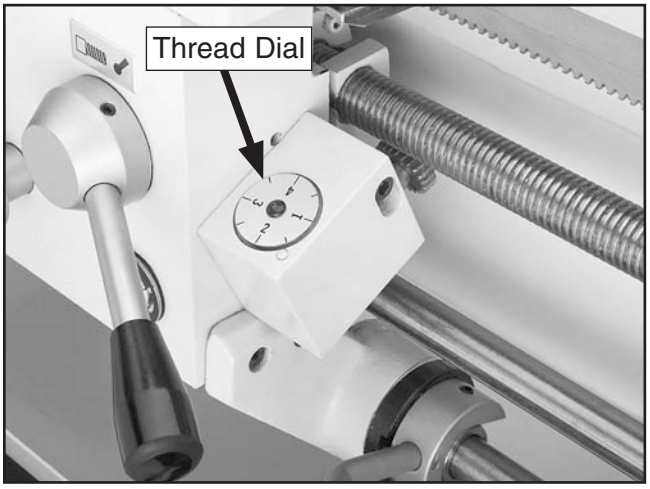


Figure 88. Thread dial.

NOTICE

The thread dial is not used for metric or fractional TPI threading. You must leave the halfnut lever engaged from the beginning until the threads are complete for these threading operations.

The following examples explain how to use the thread dial and the indicator table.

TPI Divisible by 8: For threading any inch TPI divisible by eight, use any of the lines on the thread dial (see the example in **Figure 89**).

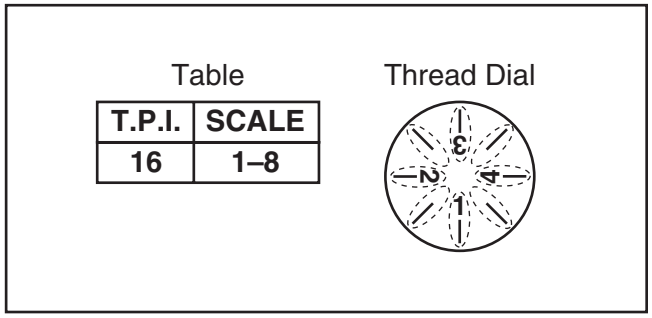


Figure 89. Example of an inch thread pitch divisible by 8.

TIP Divisible by 4 & Not by 8: For threading any inch TPI divisible by four but not by 8, use any numbered line on the thread dial (see the example in **Figure 90**).

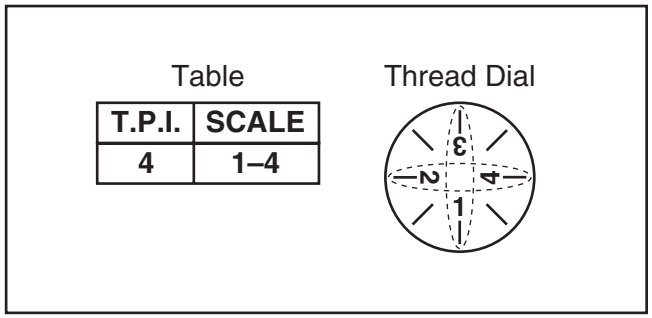


Figure 90. Example of an inch thread pitch divisible by 4.

Odd Numbered TPI: For odd numbered inch TPI, use only the number 1 on the thread dial (see the example in **Figure 91**).

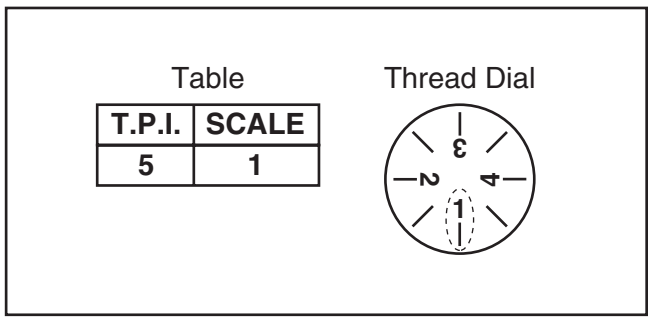


Figure 91. Example of an odd numbered inch thread pitch.

Even Numbered TPI Not Divisible by 4 or 8: For threading any even numbered TPI not divisible by 4 or 8, use either the numbers 1 and 3, or the numbers 2 and 4 (see the example in **Figure 92**).

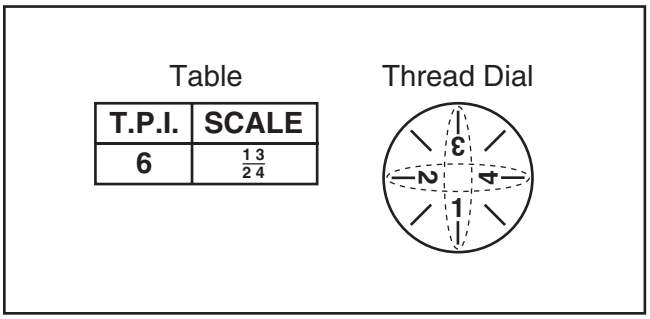


Figure 92. Example of even numbered inch thread pitch not divisible by 4 or 8.

NOTICE

The exceptions to the above threading rules are 36 and 46 TPI. Refer to the thread indicator table on the headstock side cover for the thread dial number to use for threading these TPI's.

Cutting Fluid System

When the cutting fluid pump switch is turned ***ON***, the fluid is delivered through the nozzle attached to the carriage, and the flow is controlled by the valve lever at the base of the nozzle. The cutting fluid drains into the chip tray and through the screen back into the cutting fluid reservoir (see **Figure 93**).

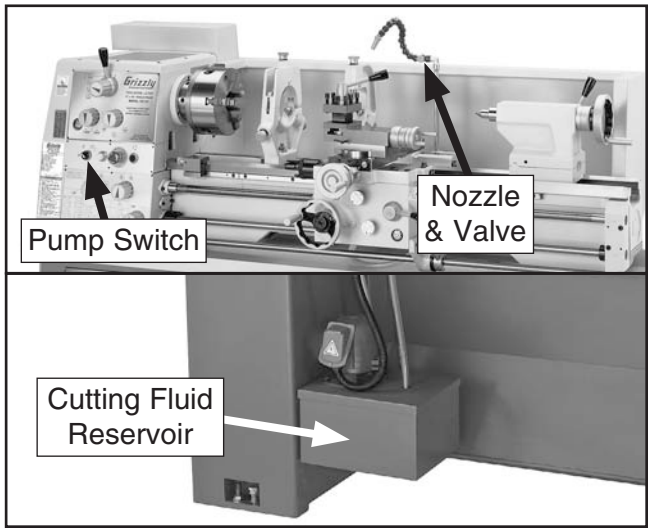
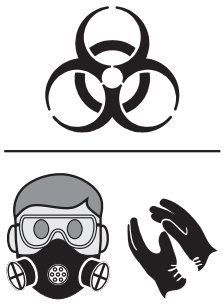


Figure 93. Cutting fluid system components.

Always use high quality cutting fluid in the cutting fluid system and follow the manufacturer's instructions for diluting. The quick reference table below can help you select the appropriate cutting fluid.

Check the cutting fluid regularly and promptly change it when it becomes overly dirty or rancid, or as recommended by the fluid manufacturer (see **Cutting Fluid System Service** on **Page 69** for detailed instructions.



⚠WARNING

BIOLOGICAL & POISON HAZARD!

Use the correct personal protection equipment when handling cutting fluid. Follow federal, state, and fluid manufacturer requirements for proper disposal.

NOTICE

Running the cutting fluid pump without adequate fluid in the reservoir may permanently damage it, which will not be covered under warranty.

To use the cutting fluid system:

1. Make sure the cutting fluid reservoir is properly serviced and filled, and that you are wearing the necessary personal protection equipment.

2. Position the fluid nozzle for your operation, then use the cutting fluid pump switch on the control panel to the turn the pump ***ON***.

3. Adjust the flow of fluid by using the valve lever at the base of the nozzle hose.

   Important: Promptly clean any splashed fluid from the floor to prevent a slipping hazard.

Workpiece	Dry	Water Soluble Oil	Synthetic Fluids	Sulferized Oil	Mineral Oil
Aluminum		X	X		
Brass	X	X	X		
Bronze	X	X	X		X
Cast Iron	X				
Low Carbon Steel		X	X		
Alloy Metals		X	X	X	X
Stainless Steel		X	X	X	X

General Note: *Cutting fluids are used for heavy-duty lathe operations and production turning. Oil-water emulsions and synthetic cutting fluids are the most common for typical lathe operations. Sulferized oils often are used for threading. For small projects, spot lubrications can be done with an oil can or brush, or omitted completely.*

SECTION 5: ACCESSORIES

WARNING

Some aftermarket accessories can be installed on this machine that could cause it to function improperly, increasing the risk of serious personal injury. To minimize this risk, only install accessories recommended for this machine by Grizzly.

NOTICE

Refer to the newest copy of the Grizzly Catalog for other accessories available for this machine.

Call 1-800-523-4777 To Order

G5562—SLIPIT® 1 Qt. Gel
G5563—SLIPIT® 12 oz Spray
G2871—Boeshield® T-9 12 oz Spray
G2870—Boeshield® T-9 4 oz Spray
H3788—G96® Gun Treatment 12 oz Spray
H3789—G96® Gun Treatment 4.5 oz Spray

Figure 94. Recommended products for protecting unpainted cast iron/steel part on machinery.

G9736—Taper Attachment for G9730 & G9731

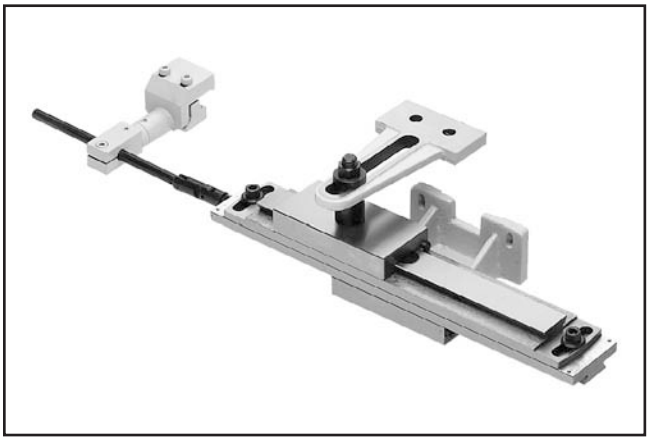


Figure 95. G9736 Taper Attachment for the G9730 and G9731.

H8257—Primrose Armor Plate with Moly-D Machine and Way Oil 1 Quart
This superior machine and way lubricant prevents stick slip and chatter due to anti-friction capabilities resulting in greater precision machining capabilities. Provides the thinnest oil film possible while effectively providing needed lubrication and rust/corrosion protection. Adhesive/cohesive components are added for vertical surfaces. Resists squeeze out, running, dripping and non-gumming.

Figure 96. Primrose Armor Plate Lubricant.

G1070—MT3 Live Center Set
A super blend of quality and convenience, this live center set offers seven interchangeable tips. High-quality needle bearings prolong tool life and special tool steel body and tips are precision ground. Supplied in wooden box.

Figure 97. G1070 Live Center Set.

G0688—Tool Post Grinder
This tool post grinder has what it takes to make your project to spec and look good, too! The heavy support casting is loaded with a precision spindle that will provide spectacular finishes on even the toughest jobs. Comes supplied with one external grinding wheel, one internal grinding wheel, and balanced mandrel pulleys and belts for each wheel.

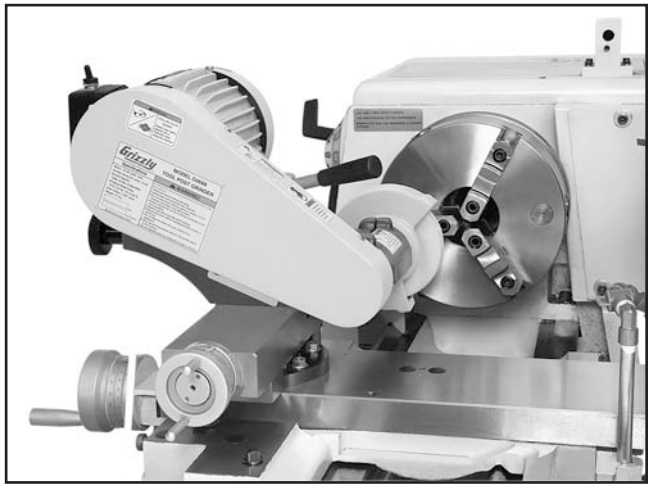


Figure 98. G0688 Tool Post Grinder.

Call 1-800-523-4777 To Order

G9610—Test Indicator
.03" Range/.001" Resolution
G9611—Test Indicator
.008" Range/.0001" Resolution
G9612—Test Indicator
.030" Range/.0005" Resolution

These test indicators have an easy to read dial and a pivoting stylus that moves at right angles to the dial face.

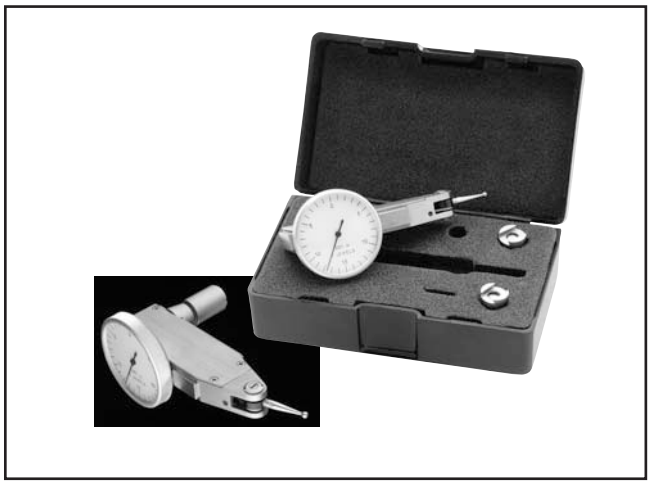
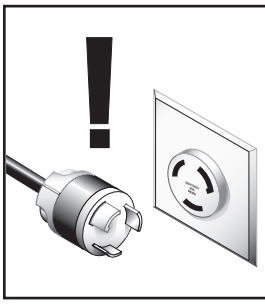


Figure 99. Test Indicator.

G7978—Rotary Phase Converter
The Model G7978 15HP Rotary Phase Converter allow you to operate the 3-phase G9731 from a single-phase power source at 100% power and 95% efficiency.

Figure 100. G7978 Rotary Phase Converter.

SECTION 6: MAINTENANCE



⚠WARNING

Always disconnect power to the machine before performing maintenance. Failure to do this may result in serious personal injury.

Schedule

Ongoing

To maintain a low risk of injury and proper machine operation, if you ever observe any of the items below, shut down the machine immediately and fix the problem before continuing operations:

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards or covers removed.
- Emergency STOP button not working correctly or not requiring you to reset it before starting the machine again.
- A reduction in braking speed or efficiency .
- Oil level not visible in the sight glasses.
- Cutting fluid not flowing out.
- Any other unsafe condition.

Daily, Before Operations

- Check/add headstock oil (**Page 64**).
- Check/add quick change gearbox oil (**Page 65**).
- Check/add apron oil (**Page 66**).
- Check/add cutting fluid (**Page 69**).
- Lubricate the bedways (**Page 67**).
- Lubricate the ball oilers (**Page 67**).
- Clean/lubricate the leadscrew and feedrod (**Page 68**)
- Check/add brake fluid (**Page 71**).
- Push the feed ON/OFF knob in and the pull the halfnut lever up to prevent crashes upon startup.
- Ensure the carriage lock is loose.

Daily, After Operations

- Depress the emergency STOP button and turn ***OFF*** the master power switch to prevent unintended startup.
- Vacuum/clean all chips and swarf from the bed, slides, and chip tray.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Monthly

- Change cutting fluid (**Page 69**).

Semi-Annually

- Change the headstock and quick change gearbox oil (**Pages 64–65**).
- Clean/lubricate the change gears (**Page 68**).

Annually

- Change the apron oil (**Page 66**).
- Check/level the bedway (**Page 21**).

Every 2 Years

- Change and bleed the brake fluid (**Page 71**)

Cleaning/Protecting

Because of its importance, we recommend that the cleaning routine be planned into the workflow schedule. Typically, the easiest way to clean swarf from the machine is to use a wet/dry shop vacuum that is dedicated for this purpose. The small chips left over after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off chips, as this may drive them deeper into the moving surfaces or cause sharp chips to fly into your face or hands.

All unpainted and machined surfaces should be wiped down daily to keep them rust free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially parts that are exposed to water soluble cutting fluid). Use a quality rust protectorate such as SLIPIT® or Boeshield® to prevent corrosion (see **Page 61** for products offered by Grizzly).

Lubrication

NOTICE

The following recommended lubrication schedules are based on light-to-medium usage. Keeping in mind that lubrication helps to protect the value and operation of the lathe, these lubrication tasks may need to be performed more frequently than recommended here, depending on usage.

Failure to follow reasonable lubrication practices as instructed in this manual could lead to premature failure of lathe components and will void the warranty.

Headstock

Oil Type ... Mobil DTE Light or ISO 32 Equivalent
Oil Amount..... Approx. 7 Liters (2 Gallons)
Check/Add Frequency ..... Daily
Change Frequency ..... Semi-Annually

The headstock gearing is lubricated by an oil bath that distributes the lubricant with the motion of the gears, much like an automotive manual transmission.

Checking Oil Level

The headstock reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The headstock sight glass is located on the left front of the headstock, as shown in **Figure 101**.

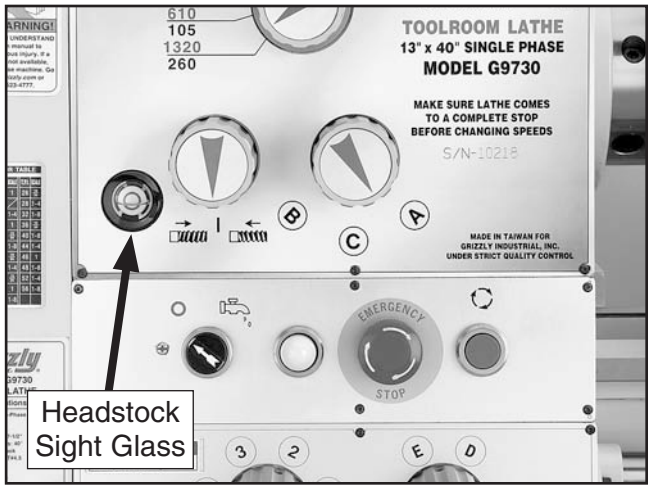


Figure 101. Location of headstock sight glass.

Adding Oil

To add oil to the headstock, you will need to remove the headstock left cover to access the headstock fill plug (see **Figure 102**), then use a 15mm wrench to remove the plug.

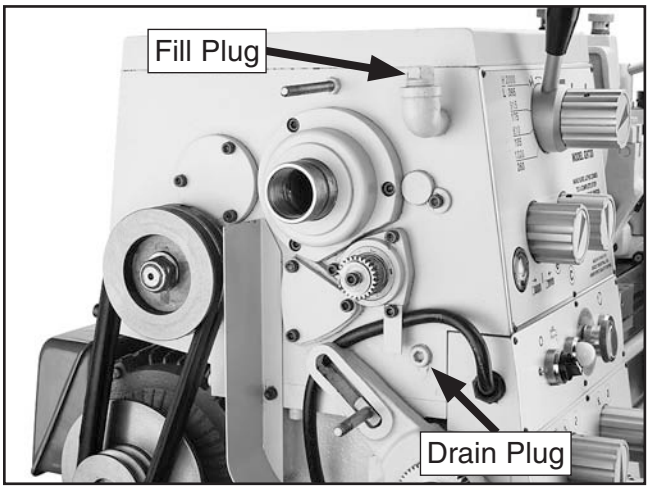


Figure 102. Headstock fill and drain plugs.

Changing Oil

Items Needed	Qty
Wrench 15mm	1
Wrench 17mm	1
Hex Wrench 8mm	1
Catch Pan 7 Liter/2 Gallon	1

To change the headstock oil:

1. Run the lathe at a medium speed for approximately 20 minutes to warm the headstock oil.

2. DISCONNECT LATHE FROM POWER!

3. Remove the headstock left cover.

4. Remove the middle change gears to fully expose the headstock drain plug, as shown in **Figure 102**.

5. Remove the fill plug to allow the oil to drain more freely, then place the catch pan under the drain plug and remove the plug.

   Important: *Do not get any oil on the V-belts or you will need to replace them. If necessary, remove them before draining the oil.*

6. When the headstock reservoir is empty, replace the drain plug and clean away any oil that may have spilled.

7. Fill the headstock reservoir until the oil level is approximately halfway in the sight glass, then replace the fill plug and the headstock left cover.

Quick Change Gearbox

Oil Type ... Mobil DTE Light or ISO 32 Equivalent
Oil Amount.....Approx. 1 Liter/1 Quart
Check/Add Frequency ..... Daily
Change Frequency ..... Semi-Annually

Checking Oil Level

The quick change gearbox reservoir has the proper amount of oil when the level in the sight glass is approximately halfway. The sight glass is located on the right side of the gearbox, as shown in **Figure 103**.

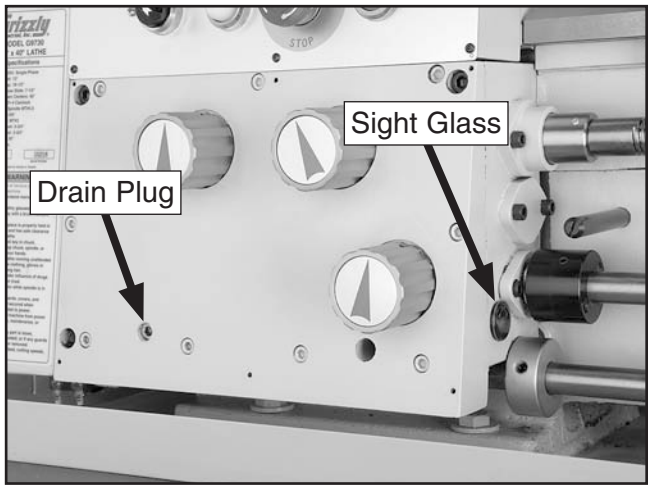


Figure 103. Locations of the quick change gearbox drain plug and sight glass (front panel removed for access).

Adding Oil

To add oil to the quick change gearbox, you will need to remove the headstock left cover to access the fill plug, then use an 8mm hex wrench to remove it (see **Figure 104**).

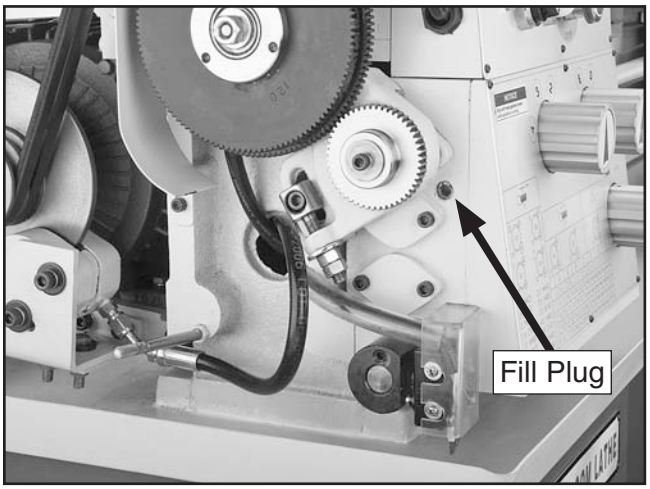


Figure 104. Location of quick change gearbox fill plug.

Changing Oil

Items Needed	Qty
Hex Wrench 2mm	1
Hex Wrench 6mm	1
Hex Wrench 8mm	1
Catch Pan 1 Liter/1 Quart	1

To change the quick change gearbox oil:

1. Rotate the headstock feed direction knob to the left or right to engage the quick change gearbox gears with the drive train.

2. Push the carriage feed ON/OFF knob in and pull the halfnut lever up to disengage the carriage from the feedrod and leadscrew during the next step.

3. Run the lathe in a medium speed for approximately 20 minutes to warm the gearbox oil.

4. DISCONNECT LATHE FROM POWER!

5. Remove the left headstock cover, then remove the gearbox fill plug (see **Figure 104** above for the location). This will allow the oil to drain freely.

6. Remove the gearbox front panel to expose the drain plug (see **Figure 103** on the previous page).

7. Position the catch pan under the drain plug, then remove it to drain the oil.

8. When the gearbox reservoir is empty, replace the drain plug and clean away any oil that may have spilled.

9. Fill the gearbox reservoir until the oil level is approximately halfway in the sight glass, then replace the fill plug, the headstock left cover, and the gearbox front panel.

Apron

Oil Type .....Mobil Vactra 2 or ISO 68 Equivalent
Oil Amount.....Approx. 1 Liter/1 Quart
Check/Add Frequency ..... Daily
Change Frequency ..... Annually

Checking Oil Level

The apron oil sight glass is on the front of the apron, as shown in **Figure 105**. Maintain the oil volume so that the level is approximately halfway in the sight glass.

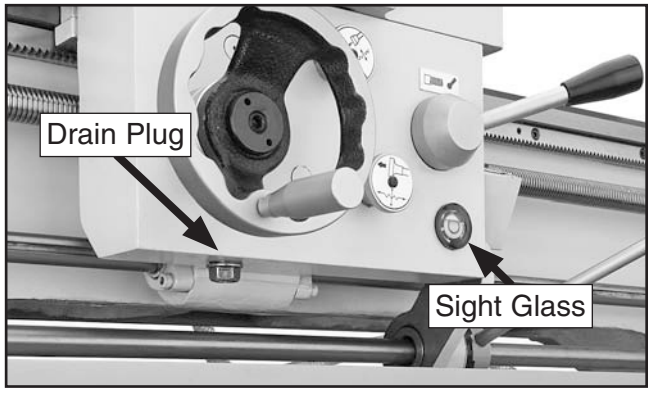


Figure 105. Locations of the apron drain plug and sight glass.

Adding Oil

Unscrew the fill plug on top of the apron (see **Figure 106**), then add the oil until the level is approximately halfway in the apron sight glass.

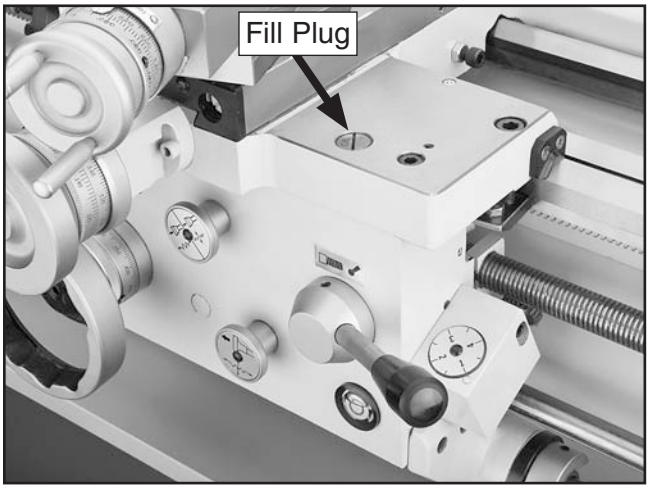


Figure 106. Location of the apron fill plug.

Changing Oil

Items Needed	**Qty**
Wrench 17mm	1
Standard Screwdriver	1
Catch Pan 1 Liter/1 Quart	1

To change the apron oil:

1. DISCONNECT LATHE FROM POWER!

2. Remove the fill plug on top of the apron to allow the oil to drain freely.

3. Position the catch pan under the drain plug (see **Figure 105**), then remove the plug.

4. When the apron reservoir is empty, replace the drain plug and clean away any oil that may have spilled.

5. Fill the apron reservoir until the oil level is approximately halfway in the sight glass, then replace the fill plug.

Bedways

Oil Type ..... Way Oil* or ISO 68 Equivalent
Oil Amount..... As Needed
Lubrication Frequency..... Daily
*See **Page 61** for an option from Grizzly

Properly cleaning and lubricating the bedways will prevent corrosion and ensure sliding lathe components will move smoothly during operation.

Vacuum the chips and swarf from the top and sides of the bedways (see **Figure 107**), then wipe them with an oiled shop rag. Make sure to move the steady rest, carriage, and tailstock to access the full length of the bedways.

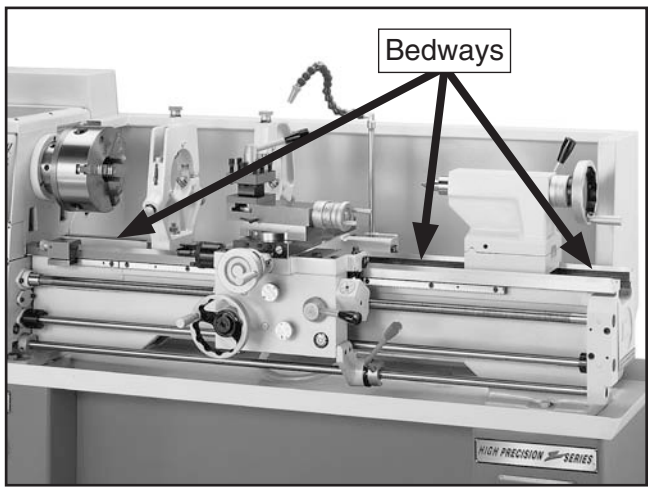


Figure 107. Lathe bedways.

Ball Oilers

Oil Type ... Mobil DTE Light or ISO 32 Equivalent
Oil Amount..... 1 or 2 Squirts
Lubrication Frequency..... Daily

This lathe has 11 ball oilers that should be oiled on a daily basis before beginning operation. In order to properly squirt oil into these devices, you will need an oil can or gun. We recommend that you use an oiling device that has a plastic or rubber tip. Metal tips can damage the ball and spring inside the ball oilers.

Clean away debris and grime from around the ball oiler, then depress the ball with the oil can tip to add oil until it can be seen exiting between the parts.

After adding the oil, move the related component through its full path of movement to evenly distribute the lubricant.

Refer to **Figures 108–110** and the following descriptions to identify the locations of each ball oiler.

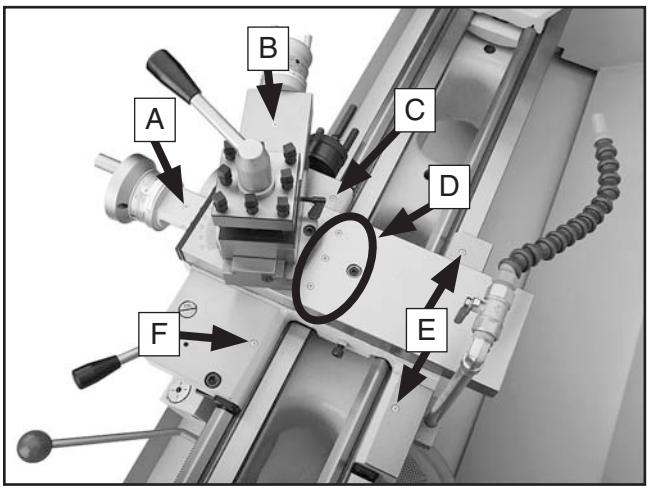


Figure 108. Carriage ball oilers.

A. Cross Slide Leadscrew Bearing
B. Compound Rest Leadscrew Bearing
C. Left Carriage Gears
D. Cross Slide Ways; Leadscrew & Nut
E. Rear Saddle Way
F. Right Carriage Gears

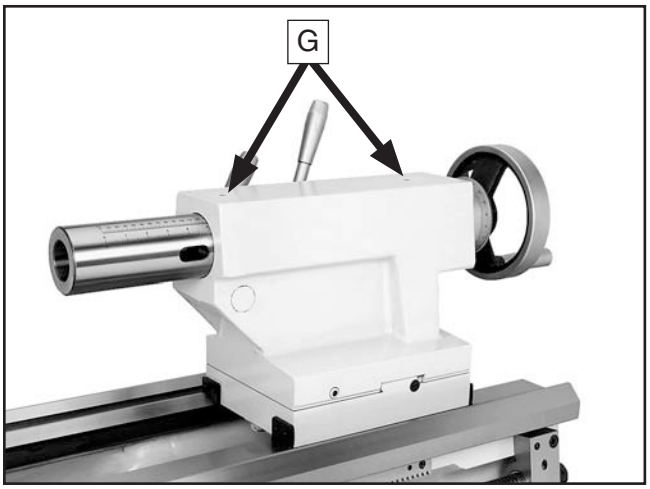


Figure 109. Tailstock ball oilers.

G. Tailstock Quill; Tailstock Leadscrew & Nut

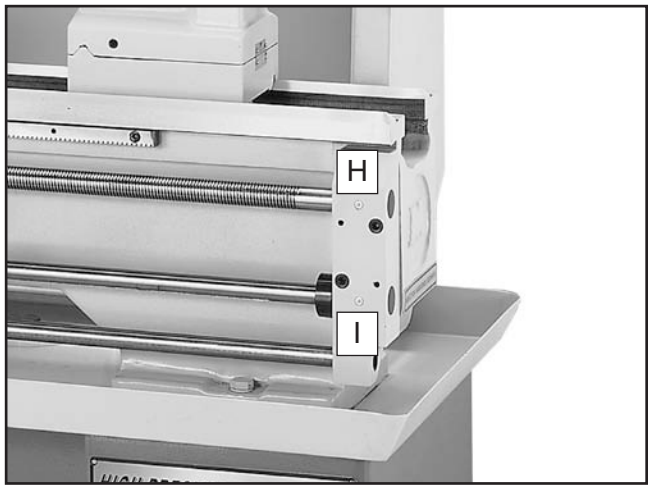


Figure 110. Leadscrew and feedrod end bearing ball oilers.

H. Leadscrew End Bushing
I. Feedrod End Bearing

Leadscrew & Feedrod

Oil Type ..... Way Oil* or ISO 68 Equivalent
Oil Amount..... As Needed
Lubrication Frequency ..... Daily

Besides cleaning and lubricating the leadscrew and feedrod daily before operations, we recommend that you perform these tasks during operation as the chips and swarf build up. This will prevent damage to the threads and surfaces of these devices and keep them operating smoothly.

Vacuum the chips and swarf from the full lengths of the leadscrew and feedrod (if necessary, use a stiff-bristled brush on the leadscrew threads), then wipe them down with an oiled shop rag (see **Figure 111**). Make sure to move the carriage to access the full lengths of these devices.

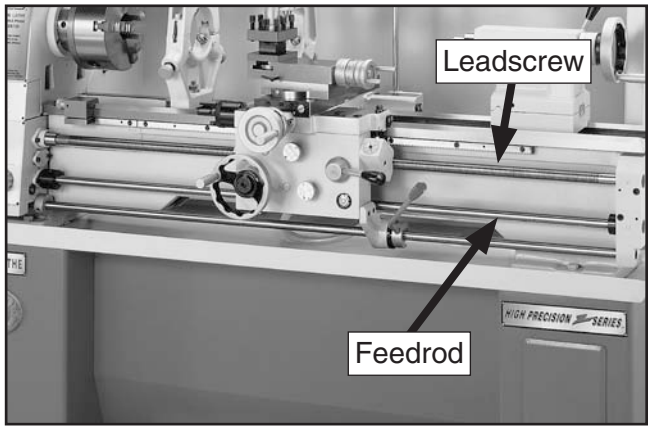


Figure 111. Leadscrew and feedrod.

Change Gears

Lubricant Type ..... NLGI#2 Grease
Lubricant Amount ..... Thin Coat
Frequency..... Semi-Annually or When Swapping

Remove the change gears, then clean them and the shafts (see **Figure 112**) with mineral spirits and small stiff-bristled brush. When they are dry, apply a thin coat of lubricant. Wipe away any excess grease to prevent it from getting on the V-belts during operation. If the V-belts become contaminated with lubricant, the power transmission from the motor will be reduced and you will need to replace them.

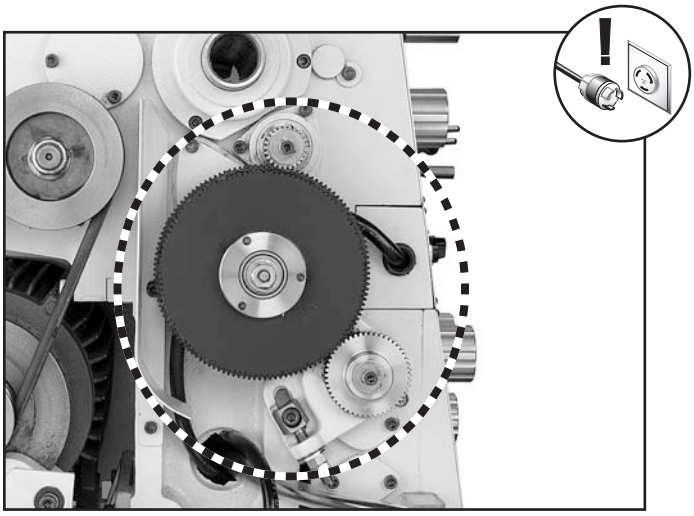


Figure 112. Change gears.

Cutting Fluid System Service

The cutting fluid system consists of a fluid reservoir, pump, and flexible nozzle. The pump pulls fluid from the reservoir and sends it to the valve at the bottom of the nozzle hose, which controls the flow of fluid to the work area. As the fluid leaves the work area, it drains into the chip pan and through a screen back into the reservoir.

Use **Figure 113** to identify the locations of the cutting fluid system controls and components.

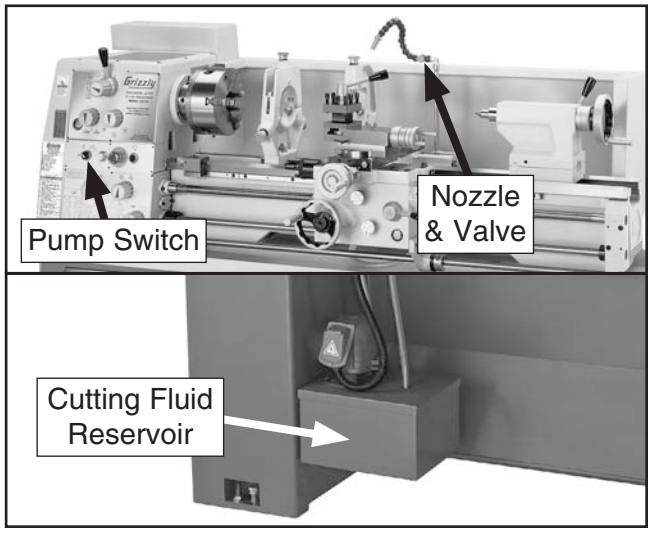


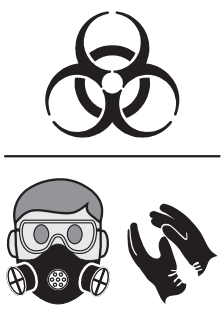
Figure 113. Cutting fluid system controls and components.

Although most swarf from lathe operations falls into the chip pan and stays there, some small chips drain into the reservoir. The pump uses a screen to prevent it from picking up the small swarf from the reservoir. However, since the swarf is spread throughout the cutting fluid system, cleaning the system on a regular basis is a requirement to maintain the life of the pump.

Hazards

As cutting fluids age, dangerous microbes can proliferate and create a biological hazard. The risk of exposure to this hazard can be greatly reduced by replacing the old fluid on a monthly basis, as indicated in the maintenance schedule.

The important thing to keep in mind when working with the cutting fluid is to minimize the exposure to your skin, eyes, and respiratory system by wearing the PPE (Personal Protective Equipment), such as splash-resistant safety glasses, long-sleeve non-absorbent gloves, protective clothing, and a NIOSH approved respirator.



⚠WARNING

BIOLOGICAL & POISON HAZARD!

Use the correct personal protection equipment when handling cutting fluid. Follow federal, state, and fluid manufacturer requirements for proper disposal.

Adding Cutting Fluid

To add cutting fluid to the reservoir, carefully lift the pump and cover assembly from the reservoir (see **Figure 114**). Take care not to excessively twist the hoses or electrical cable. When you are finished, wipe up any spilled fluid from the machine and floor to avoid creating a slipping hazard.

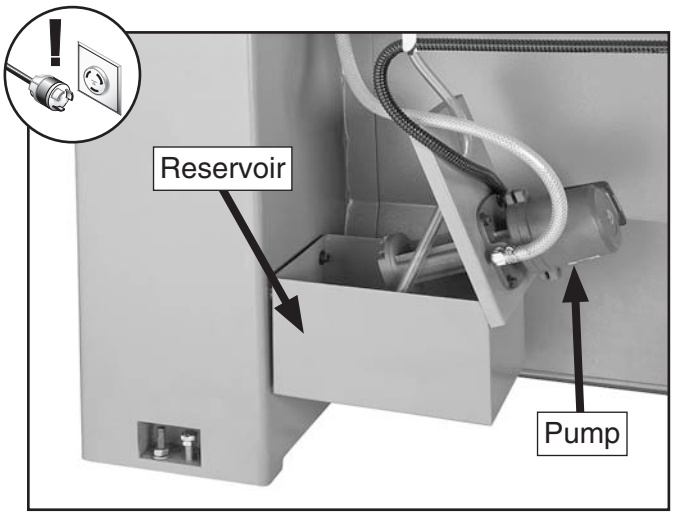


Figure 114. Cutting fluid reservoir with the cover open.

Changing Cutting Fluid

When you replace the old fluid, take the time to thoroughly clean out the chip tray and fluid reservoir. The entire job only takes about a ½ hour when you are prepared with the proper materials and tools. Make sure to dispose of all old fluid according to federal, state, and fluid manufacturer's requirements.

Items Needed	Qty
Another Person	1
Safety Wear	As Required For Each Person
Hex Wrench 6mm	1
New Cutting Fluid	Approx. 2¼ Gallons
Empty 5-Gallon Buckets w/Lid	2
Disposable Shop Rags	As Needed
Hose or Tubing ⅝" x 60" (Optional)	1
Magnets (Optional)	As Many As Desired

To change the cutting fluid:

1. Position the cutting fluid nozzle over the splash guard so that it is pointing behind the lathe. If you are using the optional hose, connect it to the end of the nozzle now.

2. Place a 5-gallon bucket behind the lathe and under the cutting fluid nozzle. If you are using the optional hose, place it in the bucket. Otherwise, you may need to have another person hold the bucket up to the nozzle to prevent fluid from splashing outside the bucket.

3. Turn the cutting fluid pump ***ON*** and pump the old fluid out of the reservoir. Turn the pump ***OFF*** after the fluid stops flowing.

> ***NOTICE***
>
> **Running the cutting fluid pump without adequate fluid in the reservoir may permanently damage it, which will not be covered under warranty.**

4. DISCONNECT LATHE FROM POWER!

5. Have another person hold the pump and cover assembly away from the fluid reservoir, then remove the cap screws that secure the reservoir to the lathe.

6. Empty any remaining fluid into the 5-gallon bucket and close the lid.

7. Clean out the swarf and residue from the chip tray and reservoir bottom, and put the waste in the second 5-gallon bucket. Wash out the reservoir with soapy water and drain it into the second 5-gallon bucket.

   Dispose of the old cutting fluid and swarf according to federal, state, and fluid manufacturer's requirements.

   Tip: *Leave one or more magnets at the bottom of the reservoir to collect metal chips and make cleanup easier next time. This will also help keep small metal chips out of the pump.*

8. Re-attach the reservoir to the lathe, then refill the it with new cutting fluid.

9. Replace the pump and cover assembly, make sure the hoses are properly positioned without kinks, then clean up any spilled fluid from the machine and floor to avoid a slipping hazard.

10. Connect the lathe to power and point the nozzle in the chip pan.

11. Turn the cutting fluid pump ***ON*** to verify that fluid cycles properly through the system, then turn the pump ***OFF***.

    Note: *It may take a few seconds for the pump to start circulating the fluid. If the fluid does not start flowing within the first minute, turn the pump **OFF** to prevent damaging it. Try priming the pump manually by pouring cutting fluid down into the nozzle, then repeat **Step 11**.*

Brake Fluid

This lathe is equipped with a hydraulic spindle brake system that consists of a master cylinder, brake pad caliper, and brake rotor (see **Figures 115–116**).

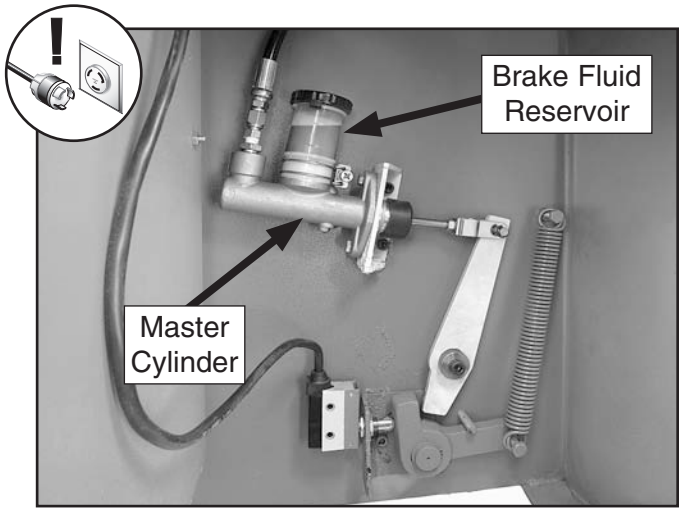


Figure 115. Brake system master cylinder and reservoir inside the left stand.

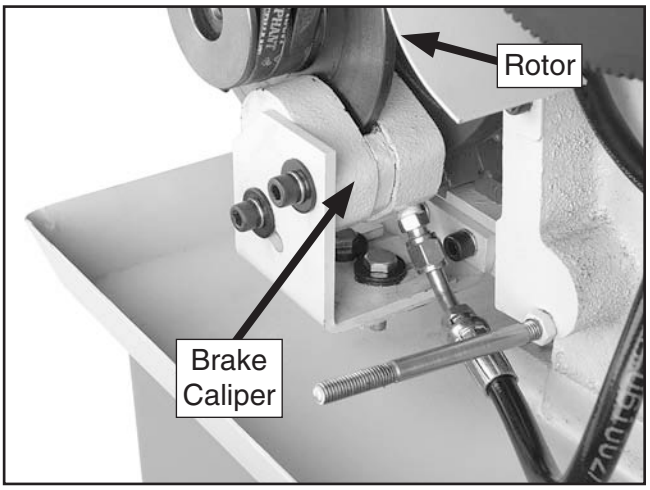


Figure 116. Brake caliper (headstock left cover removed).

NOTICE

If the brake fluid reservoir becomes empty, air could be introduced into the hydraulic lines. This will greatly reduce the effectiveness of the brake system in stopping the spindle. To correct this condition, perform the *Bleeding Brake System* procedure on *Page 86*.

The operation of this brake system is similar to that of an automobile hydraulic brake system. When the brake pedal is used, brake fluid forces the brake pads to close on the rotor, which quickly brings the spindle to a stop.

As the brake pads wear, it will take more brake fluid to produce the same stopping results. When this happens, you will need to add brake fluid to the master cylinder.

Adding Brake Fluid

Items Needed	Qty
Phillips Screwdriver #2	1
Automotive Brake Fluid DOT3	As Needed

To add brake fluid:

1. DISCONNECT LATHE FROM POWER!
2. Remove the side access panel from the left stand.
3. Put on safety goggles and non-absorbent gloves.

WARNING

POISON and CORROSIVE HAZARD!

Use safety goggles and non-absorbent gloves when working with brake fluid. Follow federal, state, and fluid manufacturer requirements to properly dispose of brake fluid.

4. Clean away any debris from the outside of the reservoir to prevent contamination of the brake fluid.

5. Turn the brake fluid reservoir cap counterclockwise to remove it.

6. Add brake fluid until the level reaches the fill line on the side of the reservoir, then replace the reservoir cap.

7. Thoroughly wipe away any brake fluid that may have spilled, then replace the stand access panel.

Changing Brake Fluid

Brake fluid will absorb moisture over time. This can lead to internal corrosion of the brake system. To prevent this condition, change the brake fluid at least once every two years. This procedure entails emptying the brake system of fluid, then properly bleeding it.

Items Needed	Qty
Another Person	1
Hex Wrench 6mm	1
Shop Rags	As Needed
Small Piece of Wood	1
Container for Used Brake Fluid	1
Automotive Brake Fluid DOT3	As Needed

To change the brake fluid:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock left cover and the side access panel from the left stand.

3. Remove the two caliper mounting cap screws and bracket hex bolts shown in **Figure 117**, then, as you remove the caliper bracket, also remove the caliper from the rotor.

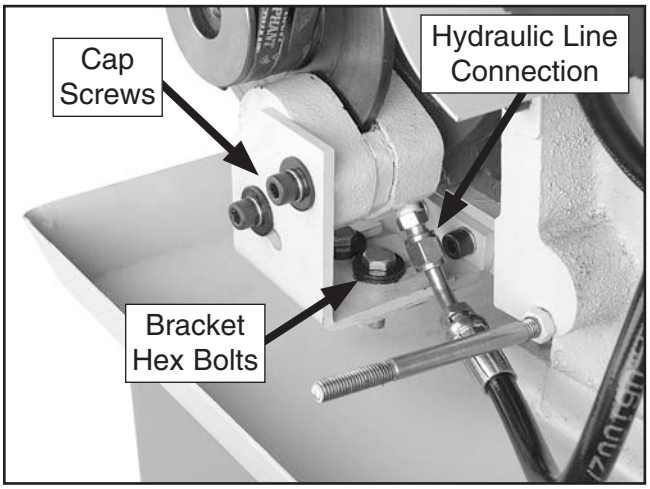


Figure 117. Brake caliper connections.

4. Place a small piece of wood between the brake pads that will fit tightly, as shown in **Figure 118**. This will keep the pads and pistons in place when pressure is applied to the system in the next steps.

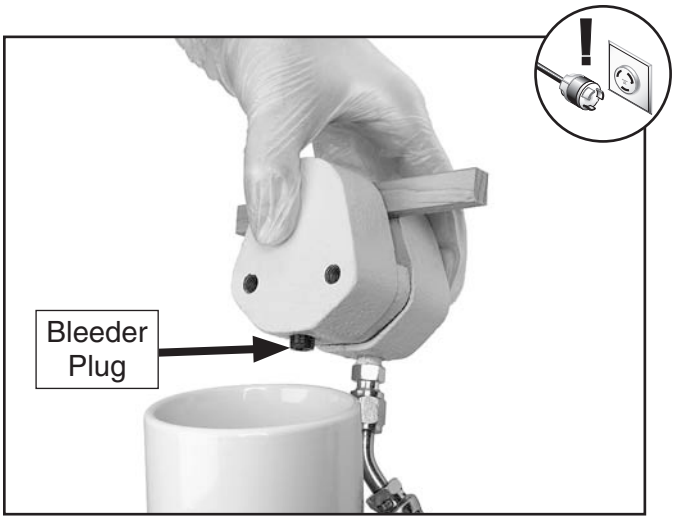


Figure 118. Preparing to bleed air from the brake system.

5. Put on safety goggles and non-absorbent gloves.

6. Reach into the left stand and remove the brake fluid reservoir top to prevent making a vacuum in the brake line during the next steps (see **Figure 118**).

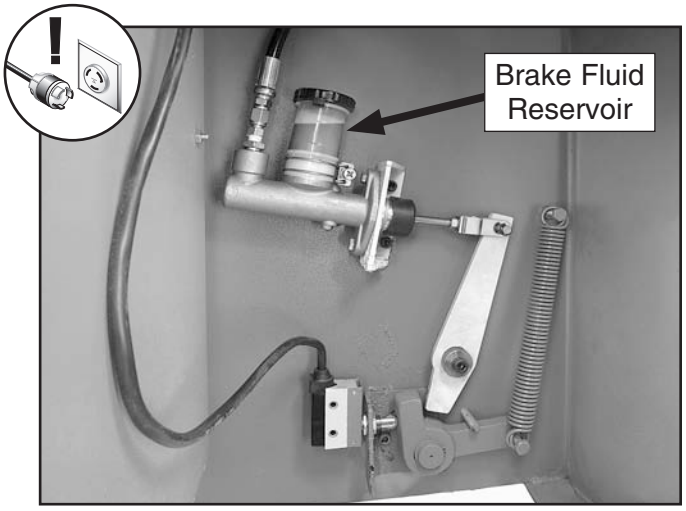


Figure 119. Brake reservoir inside the left stand.

7. Position the bleeder plug over a container to catch the used brake fluid, as shown in **Figure 118**, then remove the plug.

8. Have another person slowly pump the brake pedal until the brake fluid stops flowing from the bleeder hole.

   Note: *If there is air in the brake line, foam or bubbles may appear first. Keep pumping the brake pedal until there is a stream of brake fluid coming out of the bleeder hole, then continue pumping until there is no further fluid.*

9. Refill the reservoir with brake fluid and replace the top.

   Important: *Continually monitor the brake fluid lever in the reservoir during the next steps and make sure that it stays full. If the reservoir empties, air will be forced into the hydraulic line and you will have to re-start this part of the procedure again.*

10. Re-position the bleeder plug over a container to catch the brake fluid.

11. Have another person slowly pump the brake pedal until the brake fluid flowing from the caliper is clear and without any foam or bubbles, then hold the brake pedal all the way down on the last pump.

    At this point, all air has been forced from the system and it is fully pressurized.

12. Re-install the bleeder plug, then release the brake pedal and re-fill the brake fluid reservoir.

13. Re-install the caliper and bracket onto the rotor.

    Important: *Before fully tightening the bracket hex bolts, adjust the bracket to make sure the brake pads are equally centered on the rotor.*

14. Use the brake pedal to test for leaks and brake operation. If necessary, resolve any issues now.

15. Re-install the side access panel onto the stand and the headstock left cover before connecting the lathe to power.

Machine Storage

To prevent the development of rust or corrosion, properly prepare the lathe for storage. When decommissioning this machine, use the steps in this section to ensure that it remains in good condition for later use.

To prepare your machine for short-term storage (up to a year):

1. Pump out the old cutting fluid, and flush the lines and reservoir with warm, soapy water.
2. DISCONNECT LATHE FROM POWER!
3. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil.
4. Lubricate the machine as outlined in the lubrication section.
5. Cover and, if possible, place the machine in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make plastic guards cloudy.
6. Once or twice a month, depending on the ambient humidity levels in the storage environment, wipe down the machine as outlined in **Step 3**.
7. Every few months, start the machine and run all gear-driven components for a few minutes. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion, especially during the winter months.

To prepare your machine for long-term storage (a year or more):

1. Run the lathe for 10 minutes to bring the gearboxes to operating temperature, then drain and refill the all gearboxes with fresh oil.
2. Pump out the old cutting fluid, and flush the lines and reservoir.
3. DISCONNECT LATHE FROM POWER!
4. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, a heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that the rust preventative or grease is kept off of painted surfaces.
5. Lubricate the machine as outlined in the lubrication section.
6. Every few months, start the machine and run all gear-driven components for a few minutes. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion, especially during the winter months.
7. Loosen or remove the V-belts so they do not become stretched during the storage period. (Be sure to also affix a maintenance note near the power button as a reminder that the belts have been loosened or removed.)
8. Place a few moisture absorbing desiccant packs inside of the electrical box.
9. Cover and, if possible, place the machine in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make plastic guards cloudy.

SECTION 7: SERVICE

Review the troubleshooting and procedures in this section to fix or adjust your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

Troubleshooting

Symptom	Possible Cause	Possible Solution
Machine does not start or a circuit breaker trips.	1. (G9731 first time operation only) Lathe is wired out of phase. 2. Emergency STOP button is engaged or at fault. 3. Spindle switch(es) are at fault. 4. Power supply is switched OFF at master power switch or breaker. 5. Wall fuse/circuit breaker is blown/tripped; short in electrical system; start-up load too high for circuit. 6. Fuse has blown in machine electrical box due to thermal overload. 7. Brake switch is at fault. 8. Thermal overload relay has tripped. 9. Motor connection wired incorrectly. 10. Contactor not getting energized or has burned contacts. 11. Wiring is open or has high resistance. 12. Motor is at fault.	1. Correct out of phase wiring (see **Page 14**). 2. Rotate button clockwise until it pops out to reset it for operation; replace if not working properly. 3. Replace bad switch(es). 4. Make sure master power switch and circuit breaker are turned ***ON***. 5. Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short. 6. Replace fuse; determine if overload is due to heavy operation; ensure power source has high enough voltage and power cord is correctly sized. 7. Verify brake switch is not engaged; test and replace if necessary. 8. Turn the thermal relay cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay). 9. Correct motor wiring connections. 10. Test for power on all legs and contactor operation. Replace unit if faulty. 11. Check for broken wires or disconnected/corroded connections, and repair/replace as necessary. 12. Test/repair/replace.
Loud, repetitious noise coming from lathe at or near the motor.	1. Pulley set screws or keys are missing or loose. 2. Motor fan is hitting the cover.	1. Inspect keys and set screws. Replace or tighten if necessary. 2. Tighten fan, shim cover, or replace items.
Motor overheats.	1. Motor overloaded. 2. Brake is dragging.	1. Reduce load on motor. 2. Bleed brake system (see **Page 71**), check/replace any worn/damaged brake system components.
Motor is loud when cutting, or bogs down under load.	1. Excessive depth of cut or feed rate. 2. Spindle speed or feed rate wrong for cutting operation. 3. Cutting tool is dull.	1. Decrease depth of cut or feed rate. 2. Refer to the feeds and speed charts in **Machinery's Handbook** or a speeds and feeds calculator on the internet. 3. Sharpen or replace the cutting tool.

Symptom	Possible Cause	Possible Solution
Entire machine vibrate upon startup and while running.	1. Workpiece is unbalanced. 2. Loose or damaged V-belt(s). 3. V-belt pulleys are not properly aligned. 4. Worn or broken gear present. 5. Chuck or faceplate is unbalanced. 6. Change gears not aligned or no backlash. 7. Broken gear or bad bearing. 8. Workpiece is hitting stationary object. 9. Spindle bearings at fault.	1. Re-install workpiece as centered with the spindle bore as possible. 2. Re-tension/replace the V-belt(s) as necessary (see **Page 83**). 3. Align the V-belt pulleys. 4. Inspect gears, and replace if necessary. 5. Re-balance chuck or faceplate; contact a local machine shop for help. 6. Adjust change gears and establish backlash. 7. Replace broken gear or bearing. 8. Stop lathe immediately and correct interference problem. 9. Reset spindle bearing preload or replace worn spindle bearings (see **Page 89)**
Bad surface finish.	1. Wrong spindle speed or feed rate. 2. Dull tooling or poor tool selection. 3. Tool height not at spindle centerline. 4. Too much play in gibs.	1. Adjust for appropriate spindle speed and feed rate. 2. Sharpen tooling or select a better tool for the intended operation. 3. Adjust tool height to spindle centerline (see **Page 48**). 4. Tighten gibs (see **Page 78**).
Tapered tool difficult to remove from tailstock quill.	1. Quill is not retracted all the way back into the tailstock. 2. Contaminants not removed from taper before inserting into quill.	1. Turn the tailstock handwheel until it forces the tapered tool out of quill. 2. Clean the taper and bore, then re-install tool.
Cross slide, compound rest, or carriage feed has sloppy operation.	1. Gibs are out of adjustment. 2. Handwheel is loose. 3. Leadscrew mechanism worn or out of adjustment.	1. Adjust gibs (see **Page 78**). 2. Decrease handwheel end play (see **Page 79**). 3. Adjust backlash (see **Page 80**).
Cross slide, compound rest, or carriage handwheel hard to move.	1. Dovetail slides loaded with chips or grime. 2. Gibs are too tight. 3. Backlash setting too tight (cross slide only). 4. Bedways are dry.	1. Remove gibs, clean ways/dovetails, lubricate, and re-adjust gibs. 2. Loosen gib screw(s) slightly (see **Page 78**) and lubricate bedways. 3. Slightly loosen backlash setting (see **Page 80**). 4. Lubricate bedways/ball oilers.
Cutting tool or machine components vibrate excessively during cutting.	1. Tool holder not tight enough. 2. Cutting tool sticks too far out of tool holder; lack of support. 3. Gibs are out of adjustment. 4. Dull cutting tool. 5. Incorrect spindle speed or feed rate.	1. Check for debris, clean, and re-tighten. 2. Re-install cutting tool so no more than ⅓ of the total length is sticking out of tool holder. 3. Adjust gibs at affected component (see **Page 78**). 4. Replace or resharpen cutting tool. 5. Use the recommended spindle speed and feed rate.

Symptom	Possible Cause	Possible Solution
Workpiece is tapered.	1. Headstock and tailstock are not properly aligned with each other.	1. Re-align the tailstock to the headstock spindle centerline (see **Page 44**).
Chuck jaws will not move or do not move easily.	1. Chips lodged in the jaws or scroll plate.	1. Remove jaws, clean and lubricate scroll plate and jaws, then re-install jaws.
Carriage will not feed or is hard to move.	1. Gears are not all engaged. 2. Carriage lock is tightened down. 3. Chips have loaded up on bedways. 4. Bedways are dry. 5. Carriage stops are interfering. 6. Gibs are too tight. 7. Gears or shear pin broken.	1. Adjust gear controls. 2. Check to make sure the carriage lock is loose. 3. Frequently clean away chips that load up during operations. 4. Lubricate bedways/ball oilers. 5. Check carriage stop positions and adjust if necessary (see **Page 49**). 6. Loosen gibs screw(s) slightly (see **Page 78**). 7. Replace gears or shear pin (see **Page 87**).
Gear controls will not shift into position.	1. Gears not aligned inside headstock/ quick change gearbox.	1. Toggle spindle back-and-forth by hand with light pressure on the control until the gears mesh.

Gib Adjustment

The goal of adjusting the gibs is to remove sloppiness in the sliding surfaces without over-adjusting them to the point where the movement becomes stiff and difficult.

In general, loose gibs cause poor finishes and tool chatter. However, over-tightened gibs cause premature wear on the sliding surfaces, the leadscrew and nut, and cause hesitation in movement when using the handwheels.

The gib adjustment process usually requires some trial-and-error. Repeat the adjustment process as necessary until you find the best balance between loose and stiff movement. Most machinists find that the ideal gib adjustment is where a small amount of drag or resistance is present yet the handwheels are still easy to move.

Important: *Before adjusting the gibs, loosen the lock screw or bolt for the device so that the gibs can freely slide during adjustment.*

Cross Slide & Compound Rest Gibs

These gibs are tapered and held in position by a screw at each end (see **Figure 120**). To adjust the gib, turn one screw a ¼ turn clockwise and the other screw a ¼ turn counterclockwise, so both screws move in the same direction and the same amount. Test the feel of the sliding component by turning the handwheel, then, if necessary, adjust the gib screws to make it tighter or looser.

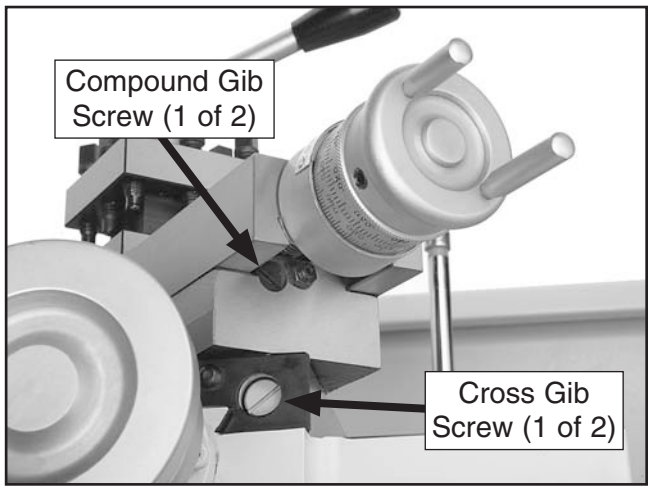


Figure 120. Locations of the compound rest and cross slide gib screws (1 of 2).

Saddle Gib

Tools Needed	Qty
Hex Wrench 5mm	1
Wrench 10mm	1
Hex Wrench 3mm	1

The saddle gib is a flat bar that is sandwiched between the saddle bracket and the bottom of the bedway.

To adjust the saddle gib:

1. DISCONNECT LATHE FROM POWER!

2. Remove the two cap screws on the left and one on the right that secure the back splash to the lathe. This will allow easy access to the saddle gib.

3. Loosen the three hex nuts, then the three set screws that secure the gib (see **Figure 121**).

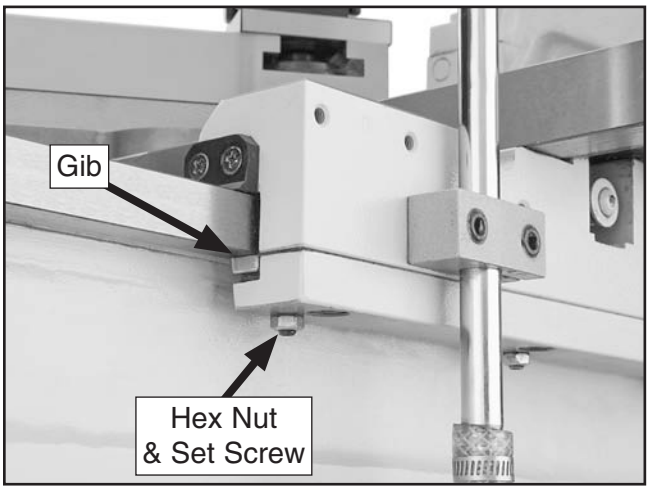


Figure 121. Saddle gib and controls.

4. Slide the gib forward or back to tighten or loosen it, then test the movement of the saddle.

5. When you are satisfied with the gib adjustment, evenly tighten the set screws until they are just snug against the gib, then tighten the hex nuts to secure the setting.

6. Replace the back splash.

Tip: *To help in containing cutting fluid and swarf, apply a good quality silicone sealant in the seams where the back splash and the lathe come together.*

Handwheel End Play

With normal use, the end play of the carriage, cross slide, and tailstock handwheels may increase. When this becomes unacceptable to you, the end play of these handwheels can be adjusted.

Keep in mind the goal is to remove any sloppy end play without binding the movement of the handwheel, which would cause excessive wear on the bearings.

Carriage & Tailstock Handwheel End Play

The end play for the carriage and tailstock handwheels is adjusted in the same manner.

Tools Needed	Qty
Hex Wrench 6mm	1
Snap Ring Pliers (or similar tool)	1

To adjust the carriage or tailstock handwheel end play:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the set screw on the handwheel hub two or three turns (see **Figure 122**).

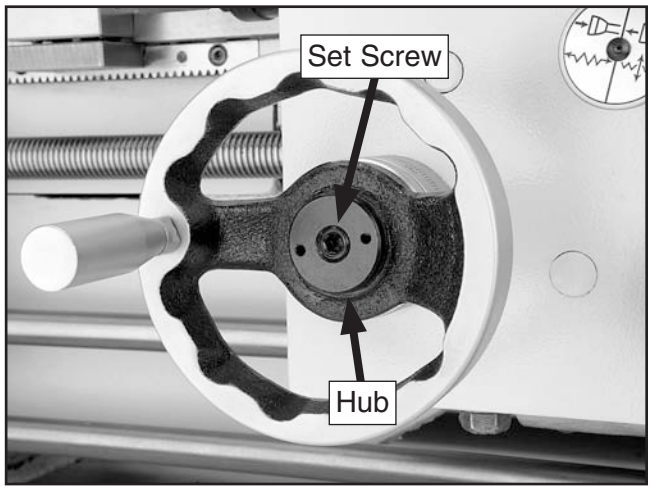


Figure 122. Handwheel hub and set screw.

3. Tighten the hub to remove the end play without binding the handwheel movement, then re-tighten the set screw to secure the setting.

Cross Slide Handwheel End Play

Tools Needed	Qty
Hex Wrench 4mm	1
Wrench 19mm	1
Locking Pliers	1
Shop Rag or Piece of Leather	1

To adjust the cross slide handwheel end play:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the handwheel set screw (see **Figure 123**), then remove the handwheel from the leadscrew.

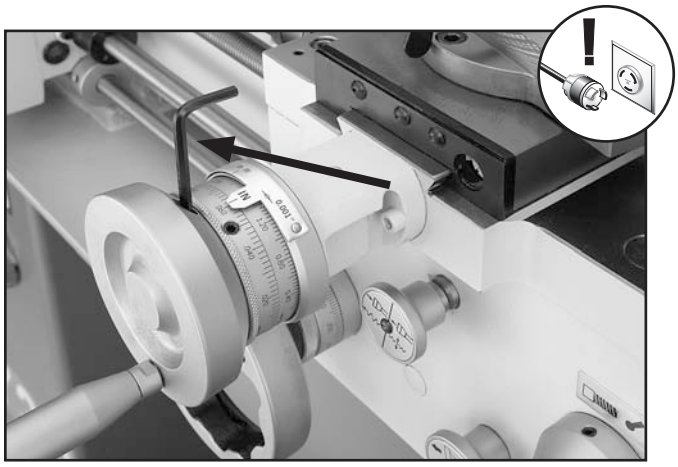


Figure 123. Loosening the cross slide handwheel set screw.

3. To prevent damage to the end of the leadscrew, wrap a shop rag or a piece of leather around it, then firmly clamp the locking pliers against the flat of the shaft (see **Figure 124**) so that you can loosen the hex nuts in the next step.

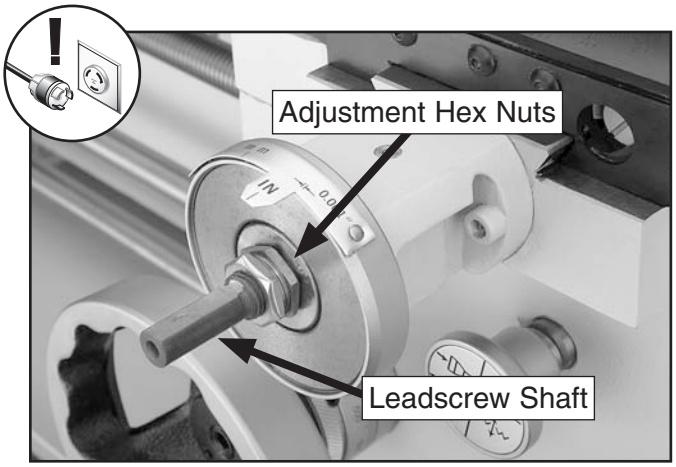


Figure 124. Leadscrew shaft and hex nuts.

4. Unthread the outside hex nut from the leadscrew shaft, then tighten the inside adjustment hex nut to remove the end play without binding the handwheel movement.

5. Re-tighten the outside hex nut against the inside adjustment hex nut without moving the inner nut.

6. Re-install the handwheel and tighten the set screw to secure it in place.

Backlash Adjustment

Backlash is the amount of free play felt while switching rotation directions with the handwheel. This can be adjusted on the compound rest and cross slide leadscrews. Before beginning any adjustment, make sure that all associated components have been cleaned and lubricated.

NOTICE

Reducing backlash to less than 0.002" is impractical and can lead to accelerated wear of the leadscrew and nut. Avoid the temptation to overtighten the components while adjusting.

Compound Rest

Tools Needed	Qty
Hex Wrench 3mm	1
Hex Wrench 4mm	1

To adjust the compound rest backlash:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the set screw that secures the compound rest handwheel to the leadscrew (see **Figure 125**), then remove the handwheel from the leadscrew.

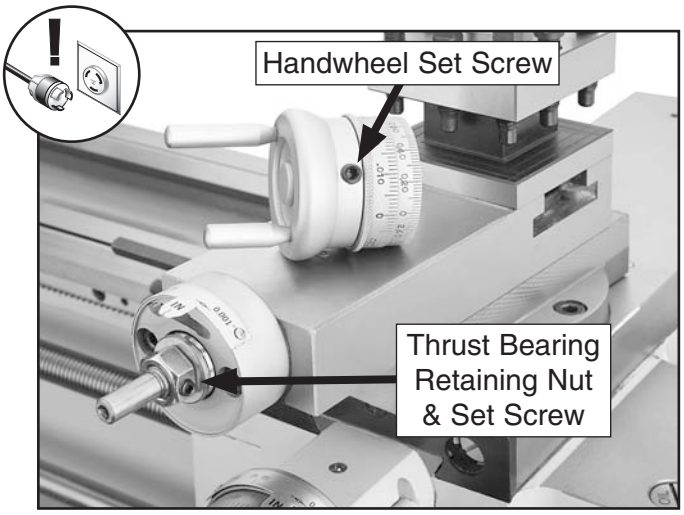


Figure 125. Compound rest backlash adjustment components.

3. Loosen the set screw in the side of the thrust bearing adjustment nut.

4. Tighten or loosen the adjustment nut to apply more or less pressure on the leadscrew thrust bearing, then rotate the leadscrew to test the results.

5. When you are satisfied with the backlash adjustment, re-tighten the adjustment nut set screw and re-install the handwheel.

Cross Slide

Tools Needed	Qty
Hex Wrench 4mm	1
Hex Wrench 5mm	1
Flashlight	1

To adjust the cross slide backlash:

1. DISCONNECT LATHE FROM POWER!

2. Remove the cap screw from the center of the slide to disengage the leadscrew nut from the slide (see **Figure 126**).

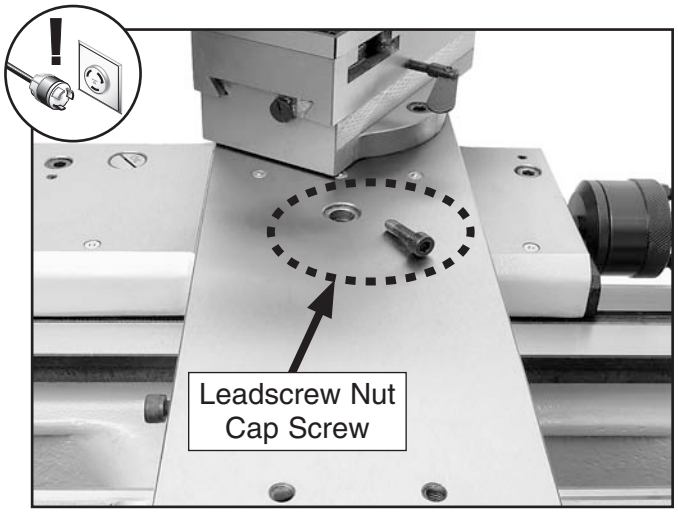


Figure 126. Leadscrew nut cap screw removed.

3. Move the slide toward you by hand—not by using the handwheel.

4. Rotate the handwheel clockwise until it stops. This will force the leadscrew nut toward the rear of the slide where you can access is (see **Figure 127**).

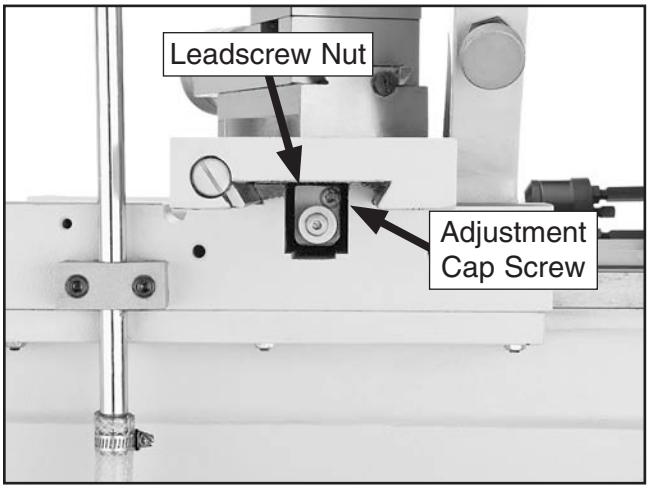


Figure 127. Cross slide leadscrew nut viewed from the rear of the slide.

5. Rotate the adjustment cap screw to tighten or loosen the clamping pressure the nut applies to the leadscrew.

   —If you are tightening it (clockwise), only rotate it until it is snug—do not overtighten.

6. Shine the flashlight down the hole where you removed the leadscrew nut cap screw in **Step 2** while you rotate the handwheel counterclockwise.

   When you see the threaded hole in the leadscrew nut align with the hole in the slide, re-install the cap screw and tighten it until it is snug.

7. Test the backlash with the handwheel, and if necessary, repeat this procedure until you attain the proper amount of backlash.

Halfnut Adjustment

The halfnut can be tightened if it becomes loose with wear. The pressure the halfnut exerts on the leadscrew is controlled by the gib which is adjusted by two set screws.

Tools Needed	Qty
Hex Wrench 3mm	1
Hex Wrench 5mm	1

To adjust the halfnut:

1. DISCONNECT LATHE FROM POWER!

2. Disengage the halfnut from the leadscrew, then remove the thread dial assembly to expose the halfnut gib set screws, as shown in **Figure 128**.

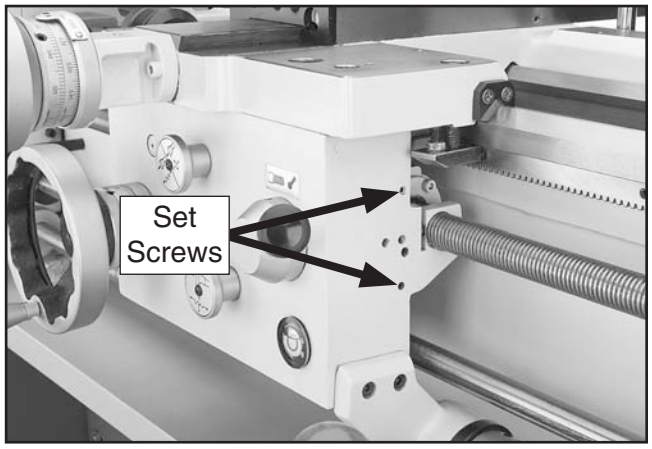


Figure 128. Halfnut gib set screws.

3. Turn both set screws approximately ⅛ turn clockwise, then engage/disengage the halfnut (you may have to rock the carriage with the handwheel to mesh the halfnut and leadscrew).

   The halfnut is correctly adjusted when it has a slight drag while opening and closing. The movement should not be too stiff or too sloppy.

4. Repeat **Step 3**, if necessary, until you are satisfied with the halfnut adjustment. If the halfnut becomes too stiff, turn the set screws counterclockwise to loosen it.

5. Re-install the thread dial.

Feedrod Clutch Adjustment

This lathe has an adjustable feedrod clutch that helps protect the drive train from overload or when using the carriage stops. The feedrod clutch release point has been adjusted at the factory. However, it can be re-adjusted depending upon operator requirements.

NOTICE

Making the feedrod clutch too tight defeats its purpose and could lead to carriage crash and lathe damage.

Tool Needed	Qty
Hex Wrench 4mm	1

To adjust the clutch release point:

1. DISCONNECT LATHE FROM POWER!

2. Move the feed selection knob on the headstock to the neutral (middle) position to disengage the feedrod from the gears.

3. Rotate the feedrod to access each of the set screws on the face of the clutch collar (see **Figure 129**).

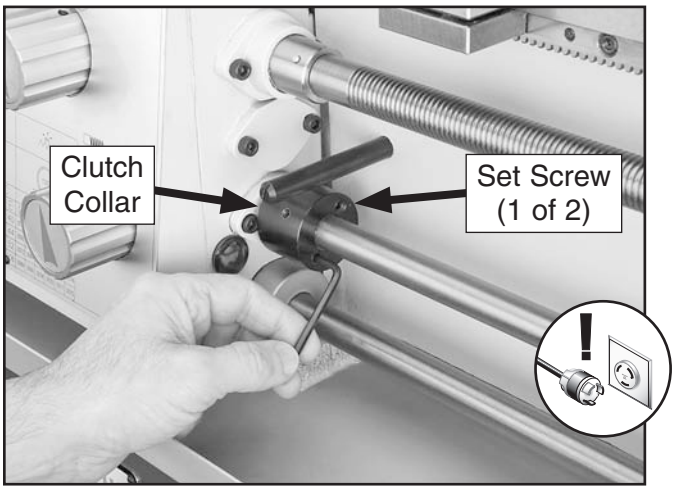


Figure 129. Adjusting feedrod clutch.

4. If you need to increase the clutch release point (make it harder to stop the carriage), then slightly tighten the set screws the same amount.

   If you need to decrease the release point, then slightly loosen the set screws the same amount.

   Note: *Threading the set screws in will increase the pressure on the compression springs that force the steel balls into the indents of the clutch. This will make it easier for the clutch to slip when necessary.*

   Threading the set screws out will decrease this pressure and make it harder for the clutch to slip.

   Important: *Do not thread the set screws in so much that the feedrod clutch will not slip if the carriage meets resistance.*

V-Belt Service

V-belts stretch and wear with use, so check them on a monthly basis to ensure optimal power transmission . Replace the V-belts as a matched set if even one of them shows signs of glazing, fraying, or cracking.

Tool Needed	**Qty**
Wrench 19mm	1

To adjust or replace the V-belts:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock left cover.

3. Adjust the hex nuts shown in **Figure 130** in even amounts to lower the motor assembly until there is approximately ⅜" deflection on each belt when moderate pressure is applied between the pulleys.

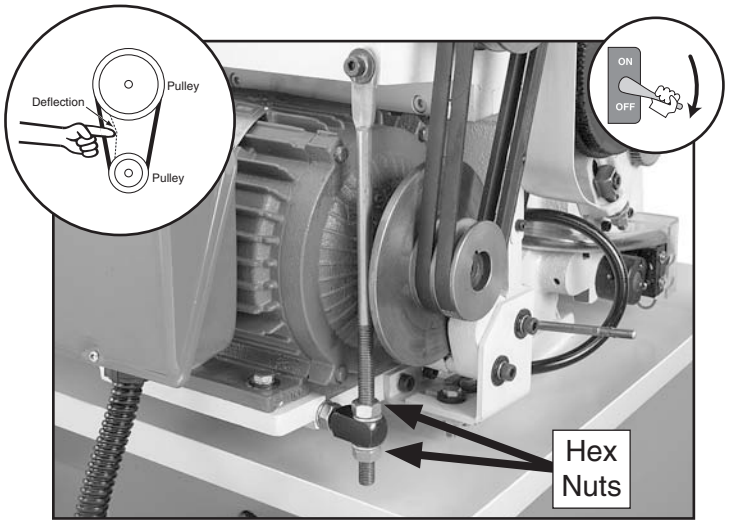


Figure 130. V-belt tension adjustment hex nuts (viewed with headstock left cover removed).

Brake Pads

When the brake pedal is pressed, the master cylinder forces brake fluid through the hydraulic lines, which in turn, forces the brake pads to close on the brake rotor (see **Figure 131**).

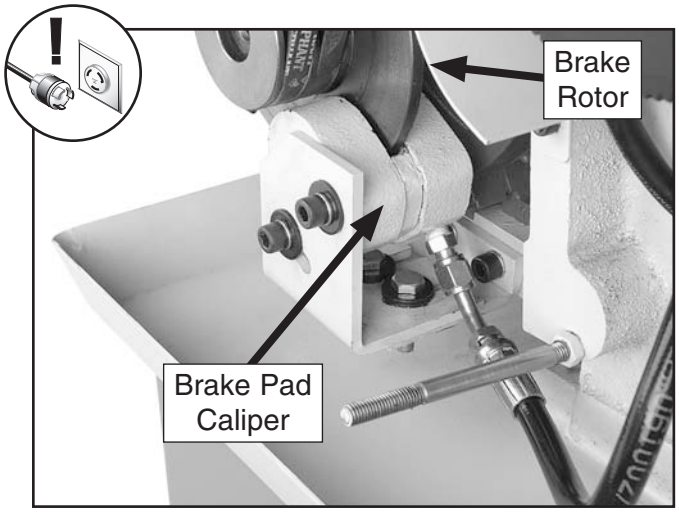


Figure 131. Brake rotor and brake pad caliper (viewed with headstock left cover removed).

With normal use, the brake pads will eventually wear and you will notice a significant decrease in the efficiency of the braking system. At this point, you will need to replace the brake pads and bleed the brake system, as instructed in the following procedure.

⚠WARNING

POISON and CORROSIVE HAZARD!

Use safety goggles and non-absorbent gloves when working with brake fluid. Follow federal, state, and fluid manufacturer requirements to properly dispose of brake fluid.

Items Needed	Qty
Hex Wrench 5mm	1
Hex Wrench 6mm	1
Wrench 13mm	1
Wrench 14mm	1
Phillips Screwdriver #2	1
Standard Bench-Mounted Vise	1
Shop Rags	As Needed
Plug for Hydraulic Line	1
Container for Used Brake Fluid	1
Automotive Brake Cleaner	As Needed
O-Rings (Part # PORP028)	2
Brake Pad Set (Part # P97302616)	1 Set

Note: *To order the O-rings and brake pad set, contact Grizzly Customer Service at (800) 523-4777.*

Replacing Brake Pads

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock left cover and the side access panel from the left stand.

3. Put on safety goggles and non-absorbent gloves.

4. Place a container under the caliper hydraulic line connection (see **Figure 132**), then remove the line from the caliper and quickly plug it to prevent the fluid leaking from the system.

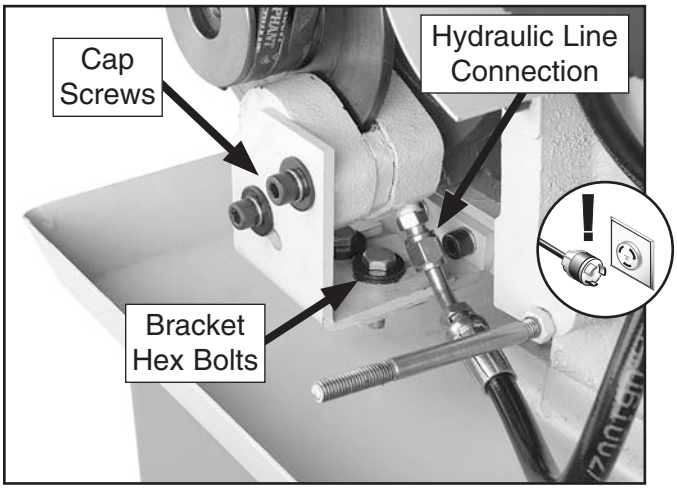


Figure 132. Brake caliper connections.

5. Remove the two caliper mounting cap screws and bracket hex bolts shown in **Figure 132**, then, as you remove the caliper bracket, also remove the caliper from the rotor.

6. Secure the caliper in the vise as shown in **Figure 133**, then remove the two cap screws that secure the caliper housings.

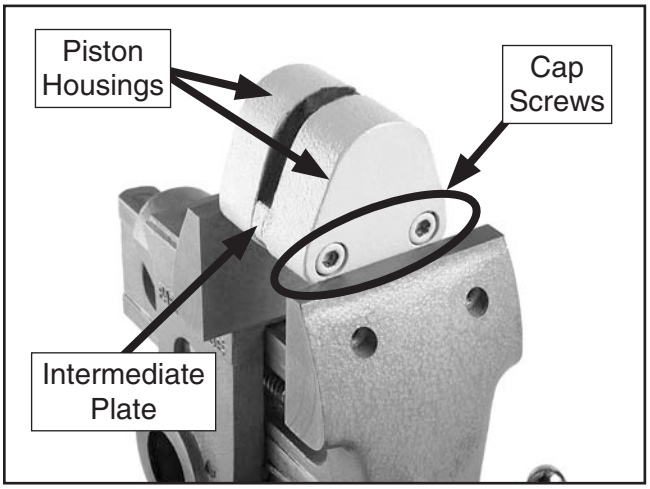


Figure 133. Caliper secured in a vise for disassembly.

7. While holding the caliper together, carefully remove it from the vise and place it on a clean shop rag, then separate the housings and intermediate plate, as shown in **Figure 134**.

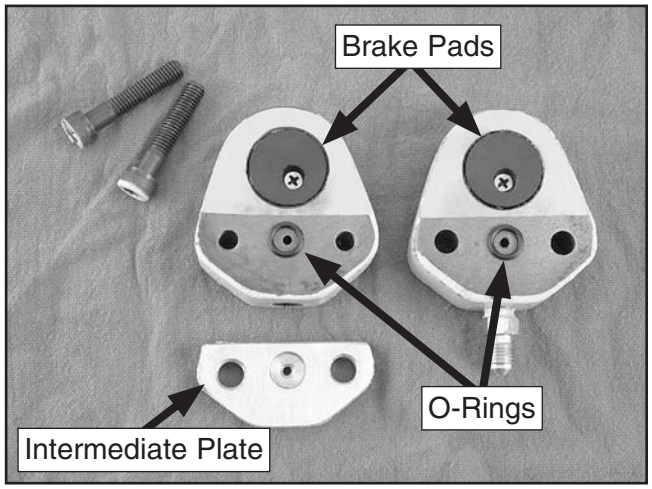


Figure 134. Caliper components.

8. Remove the flat head screws that secure the brake pads to the caliper housings, then remove the brake pads.

9. Wipe the surfaces of the remaining caliper parts with a shop rag that is damp with brake cleaner, then dry them with a clean cloth.

Note: *Do not immerse the caliper housings in brake cleaner. This will contaminate the brake fluid contained in the housings and under the pistons.*

10. Hold a shop rag over the ports and the hydraulic line fitting to absorb the brake fluid that will be forced out, then press on the pistons until they are fully seated in the housing bores (see **Figure 135**).

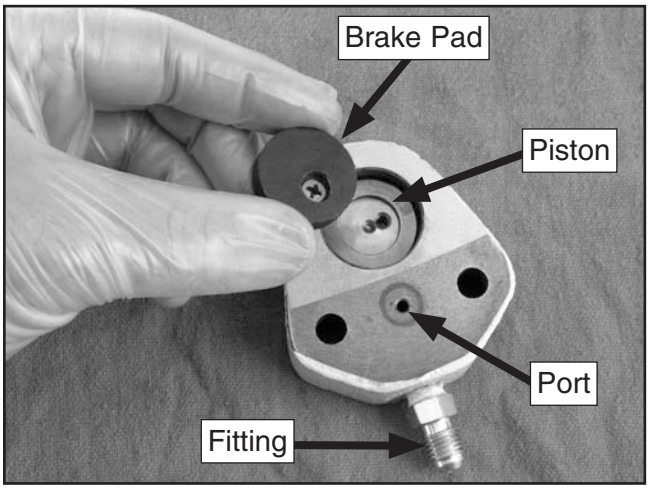


Figure 135. Installing new brake pad.

11. Wipe away any brake fluid from the parts, then install the new brake pads onto the pistons with the flat head screws removed in **Step 8**.

12. Seat the new O-rings onto both sides of the intermediate plate.

Tip: *Apply a small amount of silicone grease to the O-rings to keep them in place on the intermediate plate as you re-assemble the caliper. Do not use a petroleum-based grease that can swell the O-rings.*

13. Re-assemble the caliper housings and intermediate plate, then clamp the assembly into the vise with light pressure.

14. Re-install the two cap screws removed in **Step 6** to secure the assembly together, then, without mounting the caliper on the rotor, re-install the hydraulic line onto the caliper fitting.

15. Perform the **Bleeding Brake System** procedure as instructed on the next page.

Bleeding Brake System

If any air gets into the brake system, it will not efficiently stop the spindle. If this is the case, you will need to bleed the air from the brake system.

Items Needed	Qty
Another Person	1
Hex Wrench 6mm	1
Shop Rags	As Needed
Small Piece of Wood	1
Container for Used Brake Fluid	1
Automotive Brake Fluid DOT3	As Needed

To bleed the air from the brake system:

1. DISCONNECT LATHE FROM POWER!

2. If not already done, remove the headstock left cover and the side access panel from the left stand.

3. Put on safety goggles and non-absorbent gloves.

4. Make sure the brake fluid reservoir on top of the master cylinder is full.

Important: *Continually monitor the brake fluid lever in the reservoir and make sure that it stays full. If the reservoir empties, additional air will be forced into the hydraulic line and you will have to re-start this procedure from the beginning.*

5. If installed, remove the caliper assembly from the rotor as instructed in **Step 5** of the previous procedure, but leave the hydraulic line connected to the bottom of it.

6. Place a small piece of wood between the brake pads that will fit tightly, as shown in **Figure 136**. This will keep the pads and pistons in place when pressure is applied to the system in the next steps.

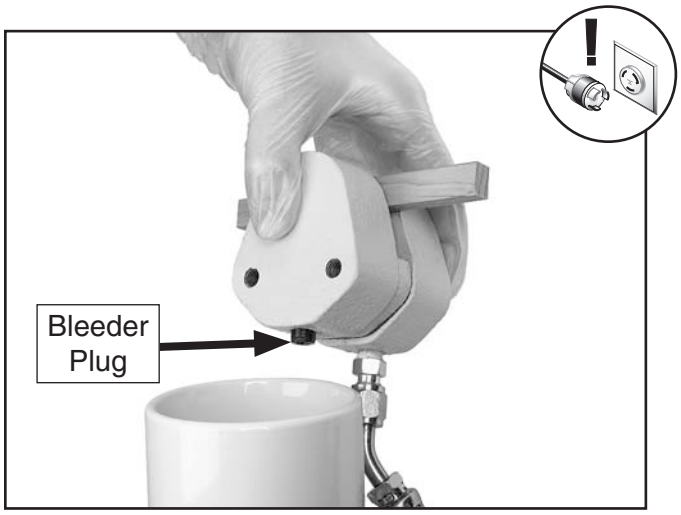


Figure 136. Preparing to bleed air from the brake system.

7. Position the bleeder plug over a container to catch the used brake fluid, as shown in **Figure 136**, then remove the plug.

8. Have another person slowly pump the brake pedal until the brake fluid flowing from the caliper is clear and without any foam or bubbles, then hold the brake pedal all the way down on the last pump.

At this point, all air has been forced from the system and it is fully pressurized.

9. Re-install the bleeder plug, then release the brake pedal and re-fill the brake fluid reservoir.

10. Re-install the caliper and bracket onto the rotor.

Important: *Before fully tightening the bracket hex bolts, adjust the bracket to make sure the brake pads are equally centered on the rotor.*

11. Use the brake pedal to test for leaks and brake operation. If necessary, resolve any issues now.

12. Re-install the side access panel onto the stand and the headstock left cover before connecting the lathe to power.

Shear Pin Replacement

The longitudinal leadscrew is secured to the connecting collar of the gear inside the headstock by an aluminum tapered shear pin (see **Figure 137**). The shear pin is designed to break and disengage the leadscrew from the headstock gear to help protect more expensive lathe components if you crash the carriage or take too large of a cut and overload the lathe.

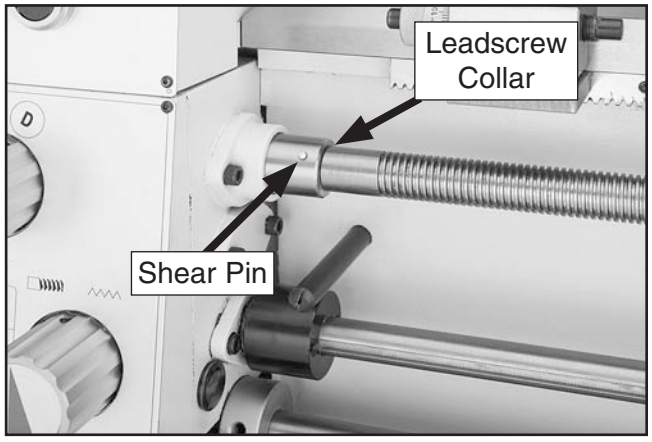


Figure 137. Leadscrew shear pin and collar.

The lathe is shipped with two spare shear pins. However, if you choose to fabricate the shear pin, refer to specifications contained in **Figure 138** to ensure that it will function correctly.

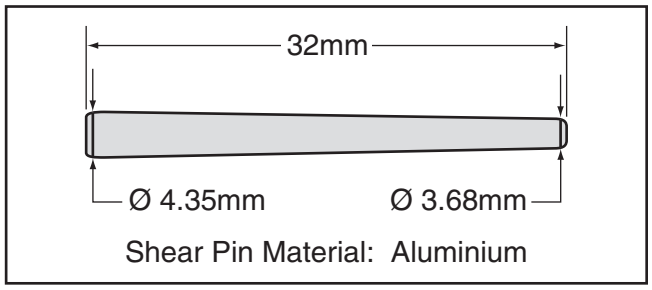


Figure 138. Shear pin specifications.

NOTICE

If you must drill out the shear pin pieces, use a drill bit ⅛" or smaller. If the dimensions of the tapered hole are changed when drilling, the leadscrew and hub will be damaged and the shear pin will not stay in the hole.

Tools Needed	**Qty**
Drill	1
Drill Bit ⅛"	1
Hammer	1
Punch 3mm or ⅛"	1

To replace a broken shear pin:

1. DISCONNECT LATHE FROM POWER!

2. Remove the leadscrew dust cap from the end bracket, as shown in **Figure 139**.

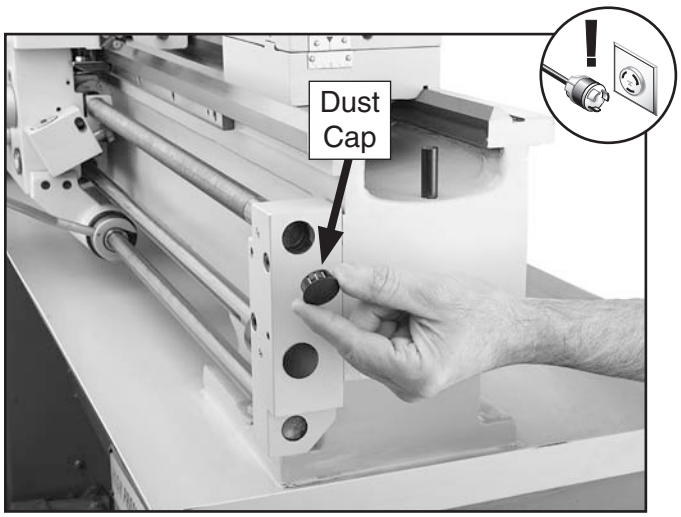


Figure 139. Removing leadscrew dust cap.

3. Engage the halfnut with the leadscrew, then slowly rotate the carriage handwheel clockwise to pull the leadscrew away from the collar.

   Important: *Take care in the next step not to bend the unsupported leadscrew.*

4. Drill out the broken pieces of the shear pin from the leadscrew and collar.

5. Carefully use the carriage handwheel to reinsert the leadscrew into the collar, then disengage the halfnut.

6. Align the tapers of the shear pin holes in the collar and leadscrew, then carefully tap the shear pin in place.

   Note: *Keep in mind that the shear pin holes are tapered and must be properly aligned to accept the new shear pin.*

7. Replace the leadscrew dust cap removed in **Step 2**.

Gap Insert Removal & Installation

The gap insert directly under the spindle (see **Figure 140**) can be removed to create additional space for turning large diameter parts.

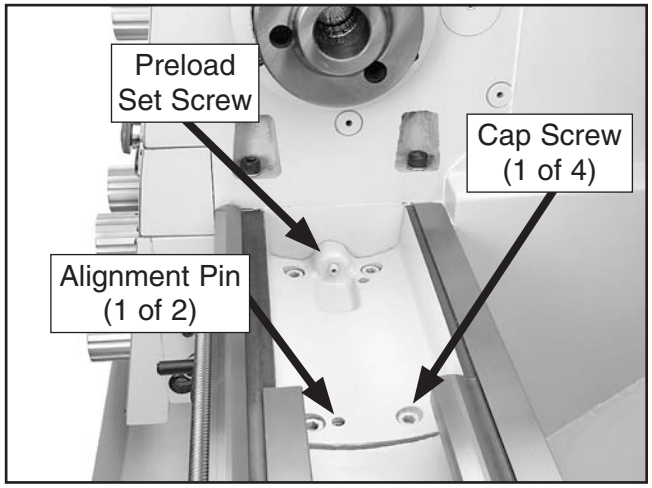


Figure 140. Gap insert.

NOTICE

The gap insert was installed, then ground flush with the bed at the factory to ensure a precision fit and alignment. Therefore, if the gap insert is removed, it may be difficult to re-install it with the same degree of accuracy.

Tools Needed	Qty
Hex Wrench 4mm	1
Hex Wrench 8mm	1
Dead Blow Hammer	1
Magnetic-Based Dial Indicator (for installation)	1

Gap Removal

1. DISCONNECT LATHE FROM POWER!

2. Unthread the preload set screw three or four turns to release the gap insert preload against the headstock casting.

3. Remove the four cap screws that secure the insert, then tap the sides of the insert with a dead blow hammer until it breaks loose.

4. To remove the insert, rock it back-and-forth until the alignment pins are free of the bed.

Gap Installation

1. DISCONNECT LATHE FROM POWER!

2. Use mineral spirits and clean, lint-free rag to clean the mating surfaces of the gap insert, bed, and ways. If necessary, stone the mating surfaces to remove scratches, dings, or burrs.

3. Apply a thin layer of light machine oil on the mating surfaces.

4. Place the insert into the gap while making sure the alignment pins are in the appropriate holes in the bed.

5. Use the dead blow hammer to fully seat and align the insert with the bed, then re-install the four cap screws removed with the insert and lightly snug them in place.

6. Move the saddle close to the gap insert and mount the dial indicator so that you can check the alignment in the next step.

7. First test the tops of the insert ways, then test the flanks. Alternately tighten the cap screws and tap the side of the insert with the dead blow hammer to bring it into alignment with the rest of the bed ways.

8. Tighten the preload set screw to add additional pressure on the insert against the bedways.

9. Inspect the gap insert alignment 24 hours after installation to make sure the gap is still aligned. If not, loosen the cap screws and preload set screw, then repeat **Step 7–8** until the insert is properly aligned.

Bearing Preload

This lathe is shipped from the factory with the preload of the spindle tapered roller bearings properly adjusted.

With use, the bearings will eventually wear and reduce the preload, causing excessive spindle end play, which is one cause for poor workpiece finish.

If the spindle becomes hotter than you can comfortably leave your hand on after operating for longer than 10 minutes, there may be too much preload and premature wear of the spindle bearings and components could occur.

If the lathe exhibits either of these symptoms, you can adjust the spindle bearing preload.

Tools Needed	**Qty**
Hex Wrench 5mm	1
Spanner Wrench 65mm	1
Magnetic-Based Dial Indicator	1
Heavy Dead Blow Hammer	1
Wooden Block	1

To adjust the spindle bearing preload:

1. Run the lathe for approximately 20 minutes at a medium speed to bring the spindle components to their normal operating temperature.

2. DISCONNECT LATHE FROM POWER!

3. Remove the headstock left cover to access the outboard spindle cover (see **Figure 141**).

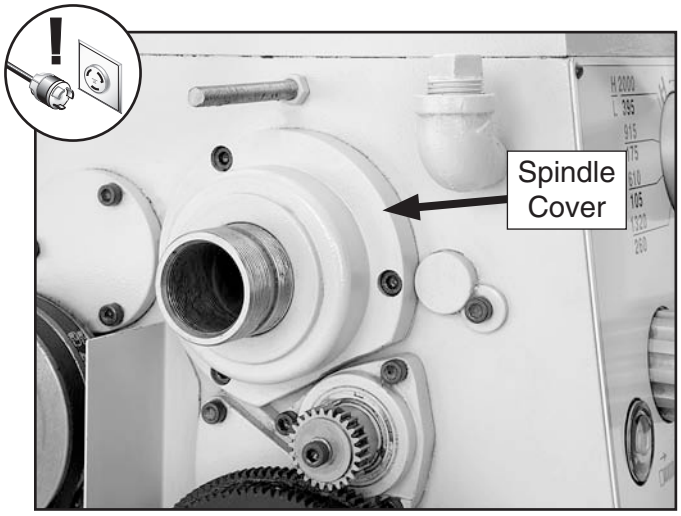


Figure 141. Outboard spindle cover (viewed with headstock left cover removed).

4. Remove the three cover cap screws and the cover to expose the spindle nut, as shown in **Figure 142**.

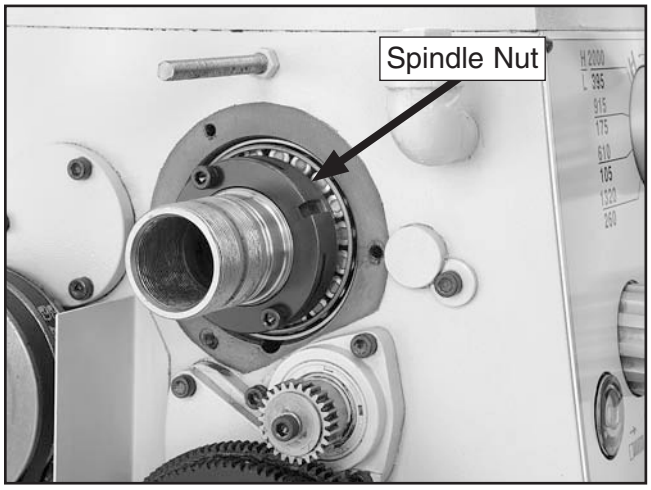


Figure 142. Spindle nut exposed.

5. With a piece of chalk, mark the rotational position of the spindle nut in relation to the spindle. This will record the original position of the spindle nut in case you need to start over.

6. Loosen the two cap screws on the spindle nut two or three turns so that the nut can be rotated in the following steps.

7. If you are performing this procedure because the normal operating temperature of the spindle is too hot, proceed with **Step 8**.

If you are performing this procedure because of excessive spindle end play, go to **Step 9**.

8. To unload the bearing preload, use the chuck key to keep the chuck and spindle from rotating, then use the spanner wrench to loosen the spindle nut one full turn counterclockwise.

Note: *You may have to tap on the outboard end of the spindle as explained in* ***Step 9*** *to help unload the spindle preload and break the spindle nut loose.*

9. Place the wooden block over the outboard end of the spindle, and hit it soundly with the heavy dead blow hammer, as shown in the example of **Figure 143**.

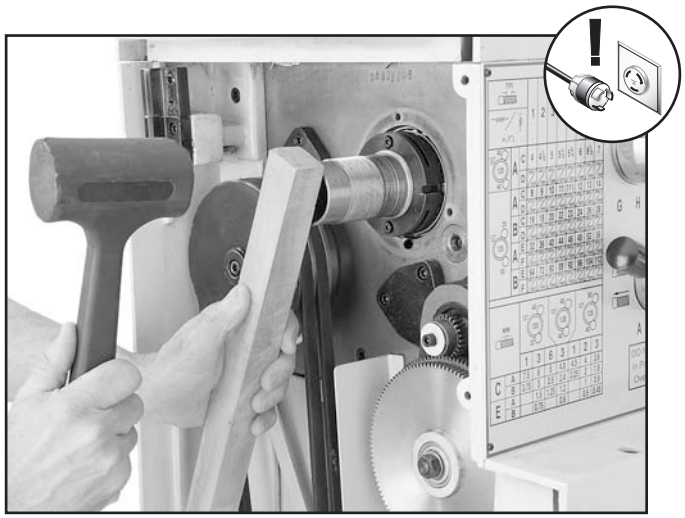


Figure 143. Example of introducing detectable spindle end play.

10. Mount the dial indicator on the cross slide and move the carriage toward the spindle until the indicator contact point just touches the chuck face, then zero out the dial (see **Figure 144** for an example).

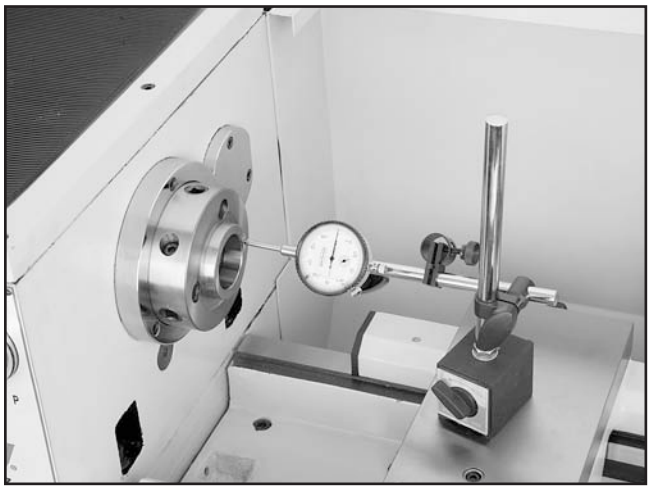


Figure 144. Example of preload dial indicator setup.

11. Move the carriage and indicator an additional 0.100" toward the spindle.

12. Use the chuck key to keep the chuck and spindle from rotating, then use the spanner wrench to tighten the spindle nut clockwise until the indicator dial needle just stops moving.

While tightening the spindle nut, rock the chuck back-and-forth slightly to make sure the tapered spindle roller bearings seat properly in their races.

When the dial indicator needle stops moving, there will be no spindle end play and no bearing preload. It is *essential* that you find this point before tightening the spindle nut further and preloading the bearings.

If you think you may have gone past the zero end play point, take the time to unload the bearings as instructed in **Step 8**, then re-tighten the spindle nut until you know you have reached the correct setting.

Tip: *Since it takes great effort to properly turn the spindle nut, you may find it difficult to know if you have gone past the zero end play point or not. It is easiest to have another person watch dial while you tighten the spindle nut.*

13. When you are confident that you have adjusted the spindle nut so that there is no spindle end play or preload, rotate the spindle nut outside circumference an additional 3/16" turn clockwise (see **Figure 145**) to introduce the proper amount of preload, which will register approximately 0.003" on the dial indicator.

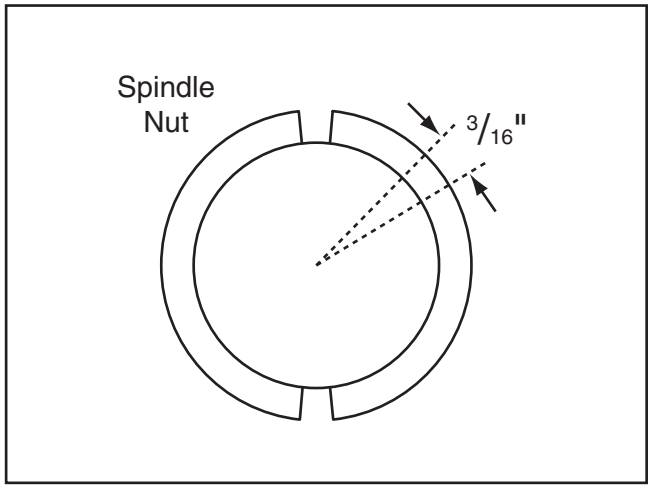


Figure 145. Rotating the spindle nut circumference 3/16" for the proper preload.

14. Re-tighten the two cap screws on the spindle nut to secure the setting, then prepare the lathe for operation by re-assembling all of the lathe parts and connecting it to power.

15. Run the lathe at a medium speed for approximately 20 minutes to bring it to the full operating temperature.

16. Turn the lathe ***OFF***, wait for the spindle to completely stop, then check the temperature of the spindle with your hand.

—If the spindle is slightly warm to the touch, you have the correct spindle bearing preload.

—If the spindle is hotter than you can comfortably keep your hand on, the preload is too tight and you must repeat this spindle bearing preload procedure.

When repeating the procedure, rotate the spanner nut 1/16" less during **Step 13**.

SECTION 8: WIRING & ELECTRICAL

These pages are current at the time of printing. However, in the spirit of improvement, we may make changes to the electrical systems of future machines. Study this section carefully. If there are differences between your machine and what is shown in this section, call Technical Support at (570) 546-9663 for assistance BEFORE making any changes to the wiring on your machine.

⚠WARNING
Wiring Safety Instructions

SHOCK HAZARD. Working on wiring that is connected to a power source is extremely dangerous. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. Disconnect the power from the machine before servicing electrical components!

MODIFICATIONS. Modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire. This includes the installation of unapproved aftermarket parts.

WIRE CONNECTIONS. All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.

CIRCUIT REQUIREMENTS. You MUST follow the requirements at the beginning of this manual when connecting your machine to a power source.

WIRE/COMPONENT DAMAGE. Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components.

MOTOR WIRING. The motor wiring shown in these diagrams is current at the time of printing but may not match your machine. If you find this to be the case, use the wiring diagram inside the motor junction box.

CAPACITORS/INVERTERS. Some capacitors and power inverters store an electrical charge for up to 10 minutes after being disconnected from the power source. To reduce the risk of being shocked, wait at least this long before working on capacitors.

EXPERIENCING DIFFICULTIES. If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (570) 546-9663.

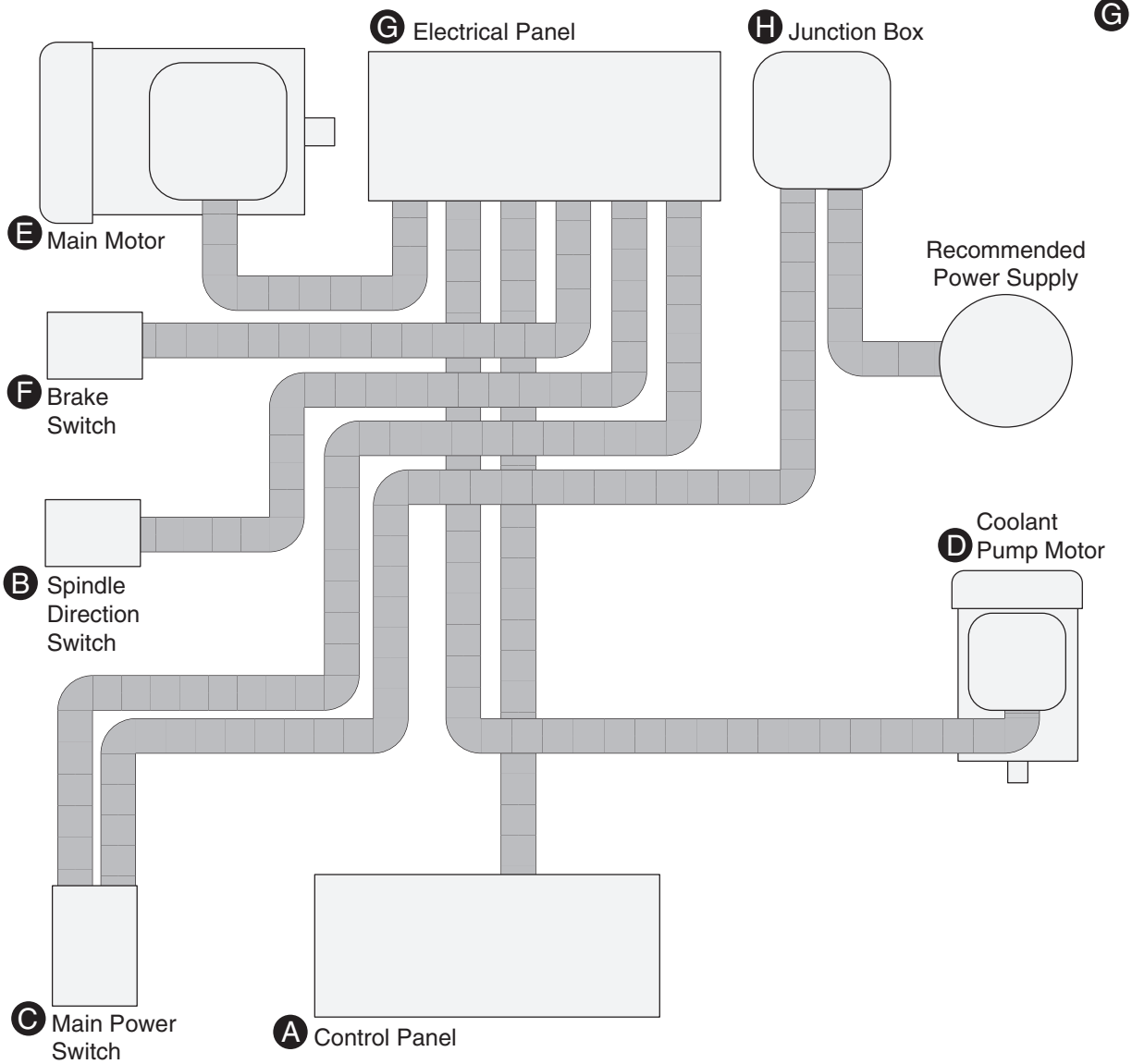
NOTICE

The photos and diagrams included in this section are best viewed in color. You can view these pages in color at www.grizzly.com.

COLOR KEY

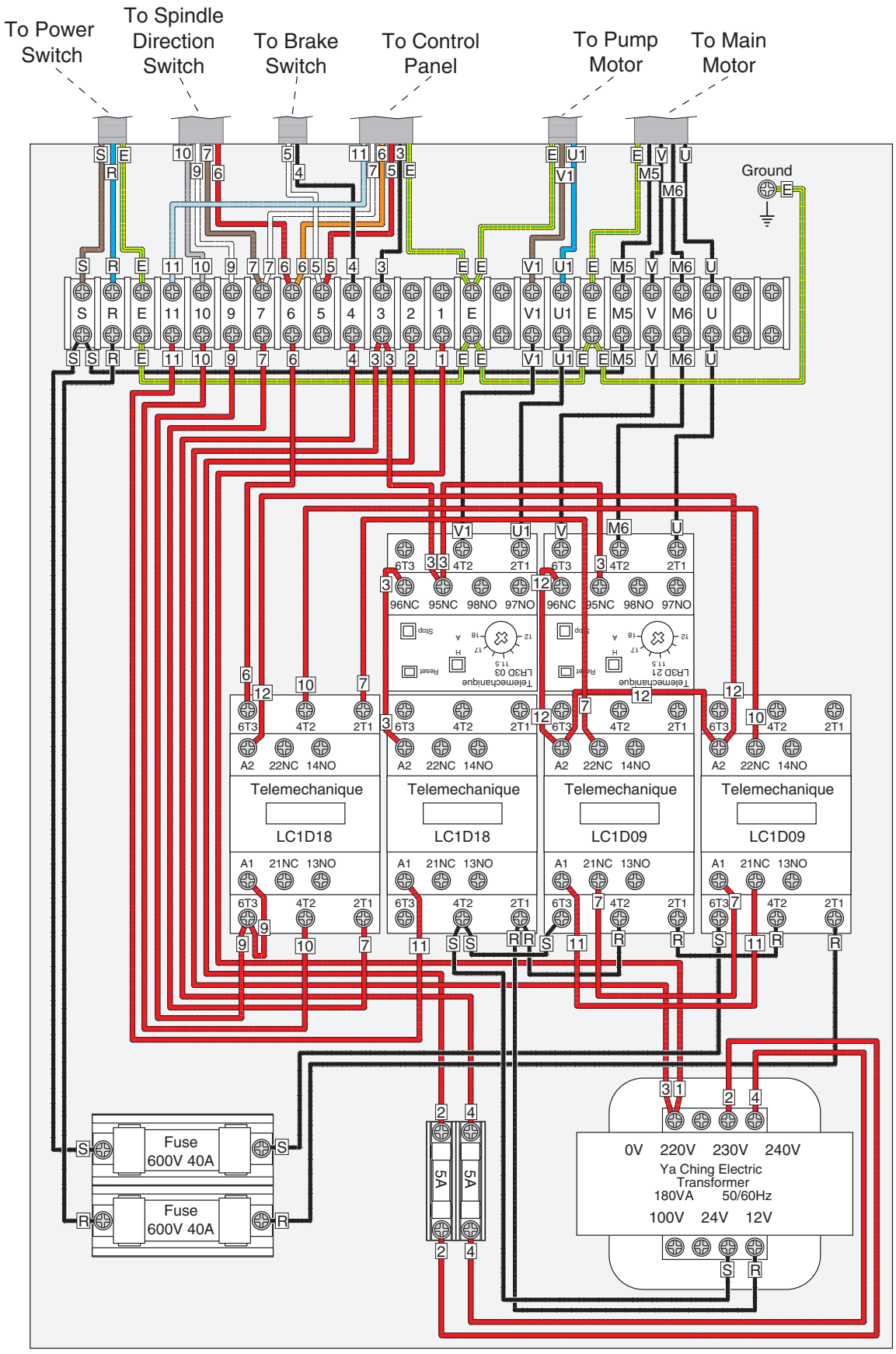
BLACK	Bk	BLUE	Bl	YELLOW	Yl	LIGHT BLUE	Lb
WHITE	Wt	BROWN	Br	YELLOW GREEN	Yg	BLUE WHITE	Bw
GREEN	Gn	GRAY	Gy	PURPLE	Pu	TURQUOISE	Tu
RED	Rd	ORANGE	Or	PINK	Pk		

Wiring Overview



STOP *READ ELECTRICAL SAFETY ON PAGE 92!*

G9730 Control Panel Wiring



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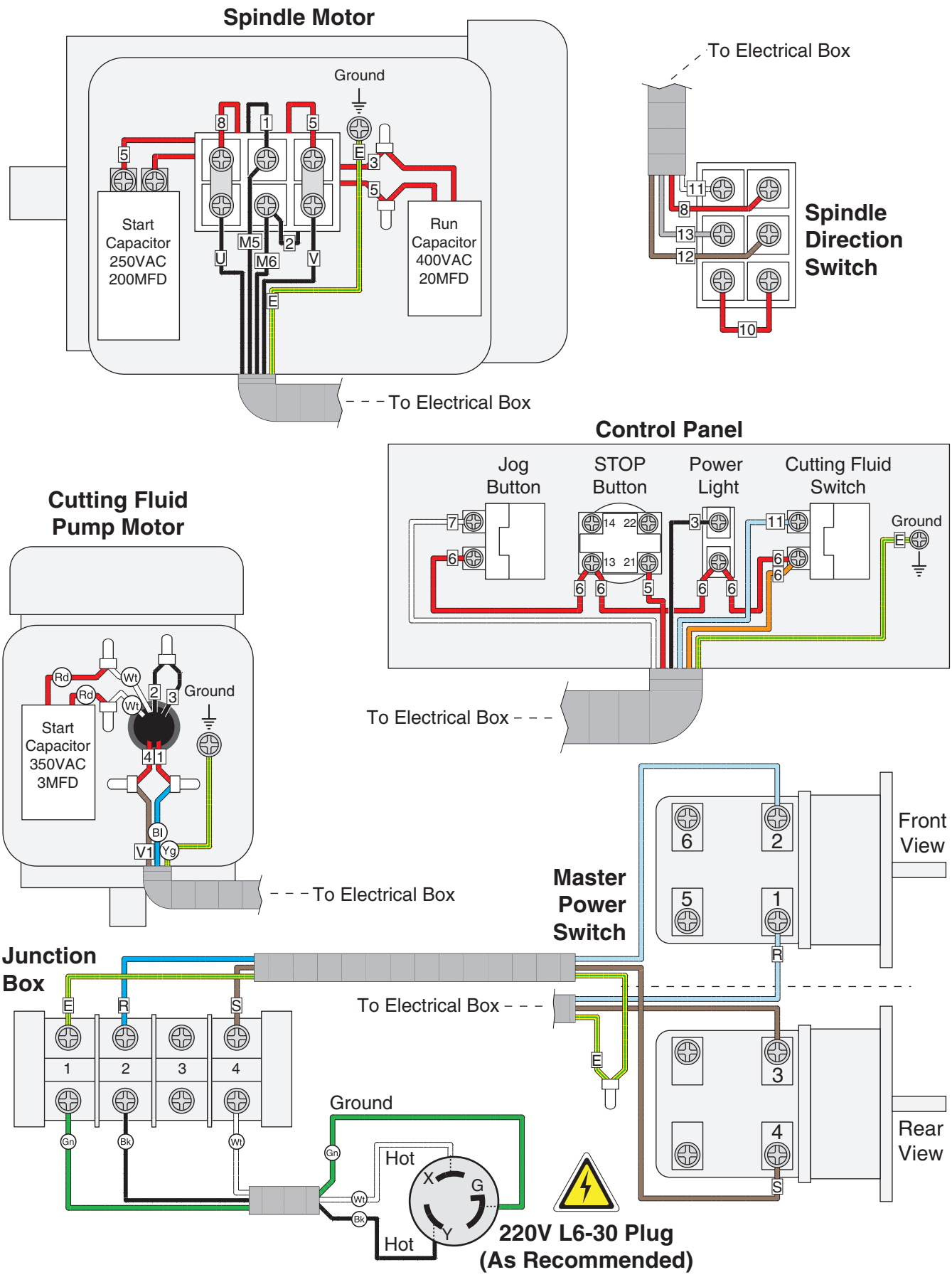
G9730 Component Wiring



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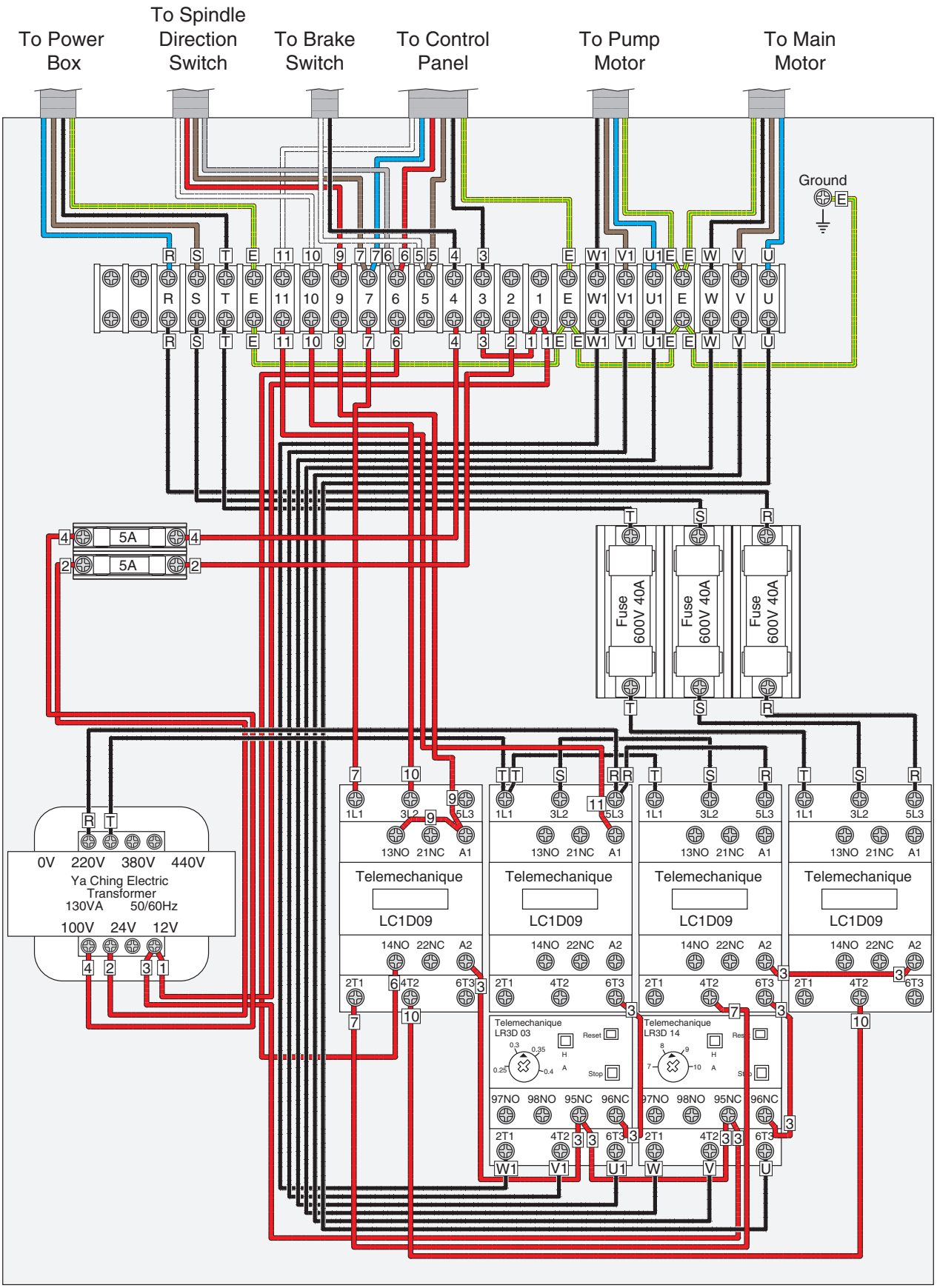
G9731 Control Panel Wiring



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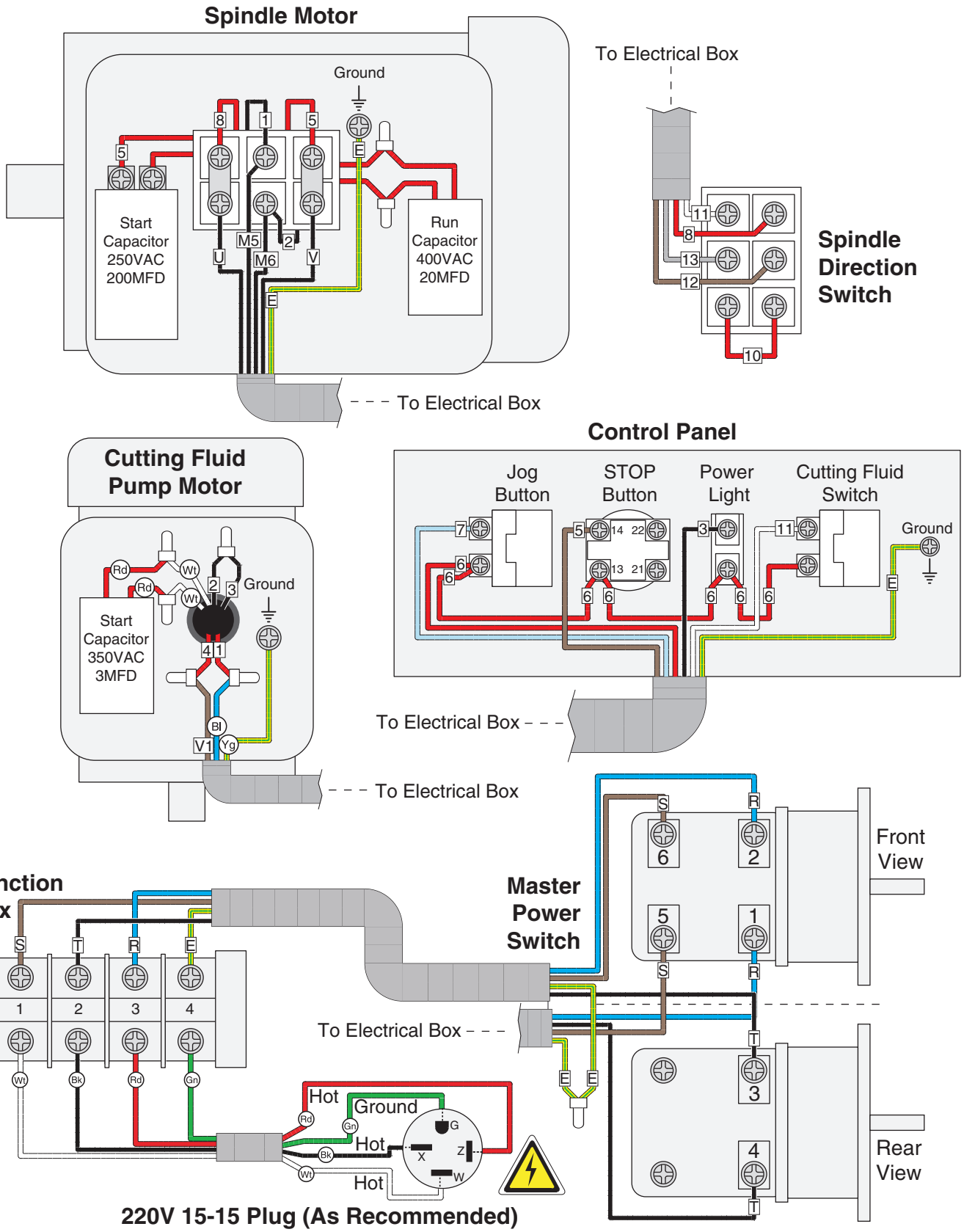
G9731 Component Wiring



Electrical Locations

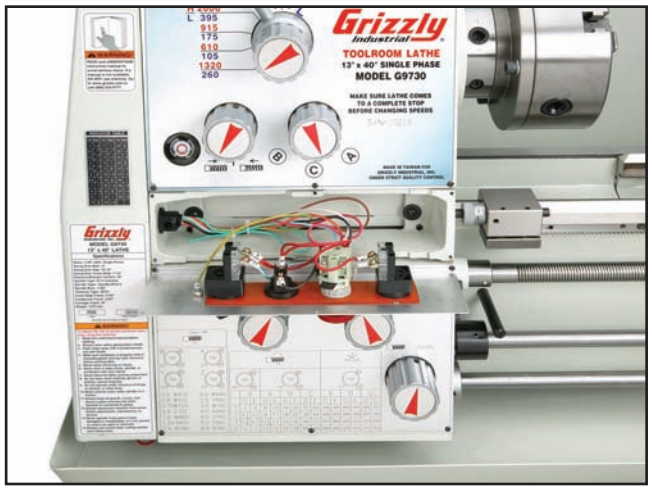


Figure 146. Control panel wiring.

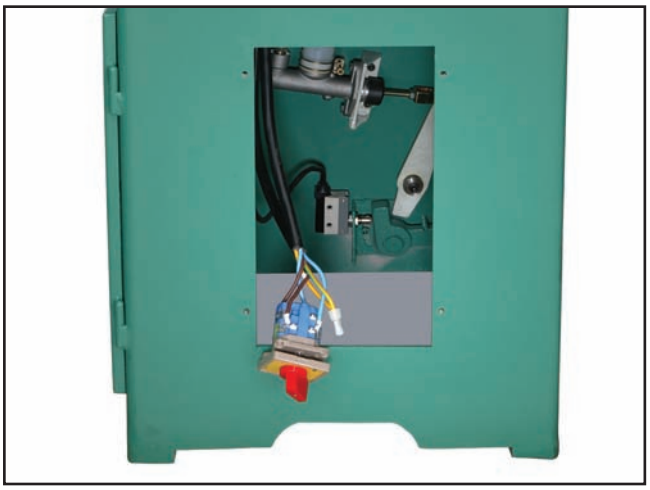
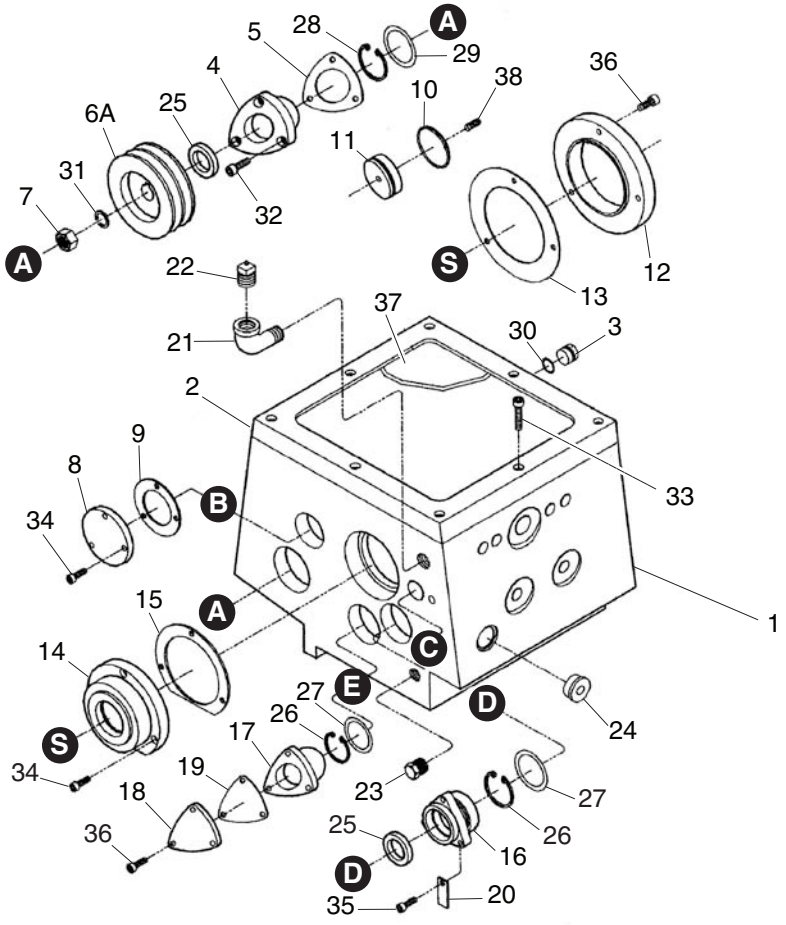


Figure 148. Main power switch wiring.

Figure 147. Electrical cabinet and motor wiring.

SECTION 9: PARTS

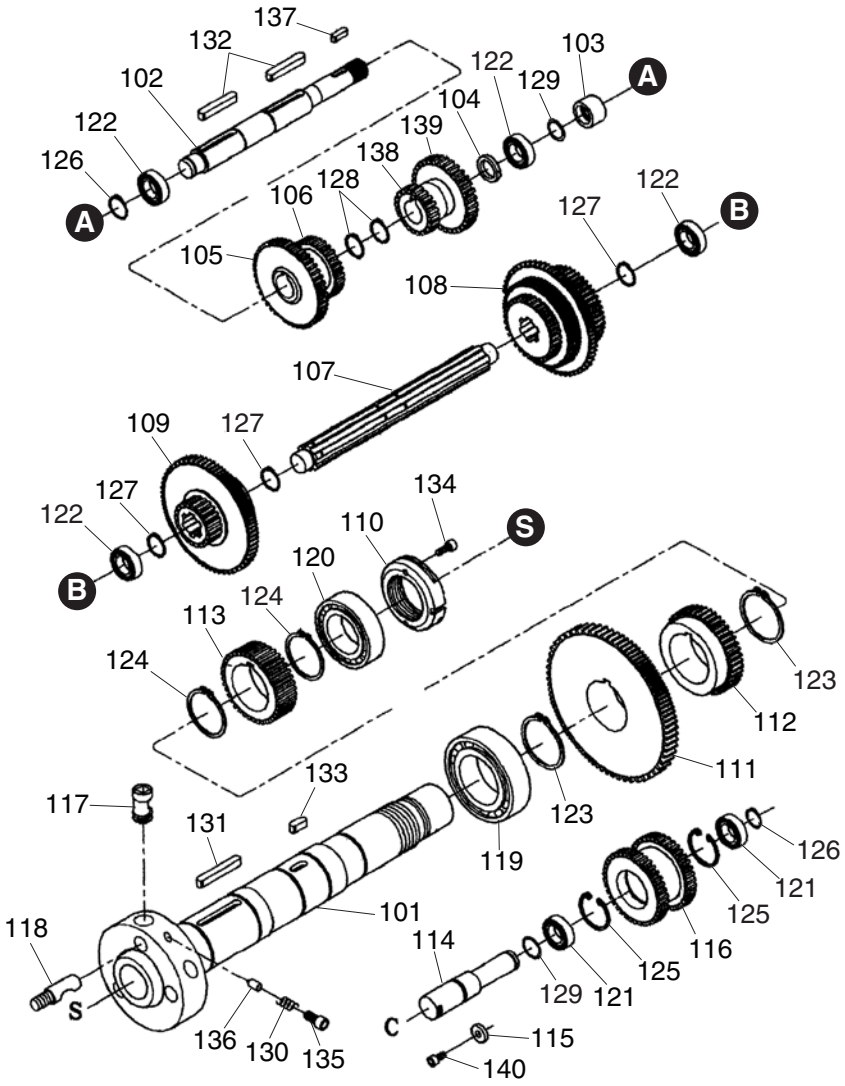
Headstock Casing



REF	PART #	DESCRIPTION
1	P9730001	HEADSTOCK CASE
2	P9730002	HEADSTOCK COVER
3	P9730003	PLUG
4	P9730004	BEARING SEAT
5	P9730005	GASKET
6A	P9730006A	PULLEY 2000 RPM 60 CS
7	PLN05	LOCK NUT 3/4-16
8	P9730008	SIDE COVER
9	P9730009	COVER GASKET
10	PORP041	O-RING 40.7 X 3.5 P41
11	P9730011	CASING PLUG
12	P9730012	FRONT BEARING COVER
13	P9730013	FRONT BEARING COVER GASKET
14	P9730014	REAR BEARING COVER
15	P9730015	REAR BEARING COVER GASKET
16	P9730016	BEARING SEAT
17	P9730017	BEARING SEAT
18	P9730018	BEARING SEAT COVER
19	P9730019	BEARING SEAT COVER GASKET

REF	PART #	DESCRIPTION
20	P9730020	PLATE
21	P9730021	ELBOW 1/2 PT
22	P9730022	PLUG 1/2 PT
23	P9730023	PLUG 3/8 PT
24	P9730024	OIL SIGHT GLASS
25	P9730025	OIL SEAL TC28 42 10
26	PR24M	INT RETAINING RING 42MM
27	PORP046	O-RING 45.7 X 3.5 P46
28	PR25M	INT RETAINING RING 47MM
29	PORG050	O-RING 54.4 X 3.1 G50
30	PORP016	O-RING 15.8 X 2.4 P16
31	PLW10	LOCK WASHER 3/4
32	PCAP11M	CAP SCREW M8-1.25 X 16
33	PCAP07M	CAP SCREW M6-1 X 30
34	PCAP01M	CAP SCREW M6-1 X 16
35	PCAP02M	CAP SCREW M6-1 X 20
36	PCAP06M	CAP SCREW M6-1 X 25
37	P9730037	RUBBER MAT
38	PSS20M	SET SCREW M8-1.25 X 8

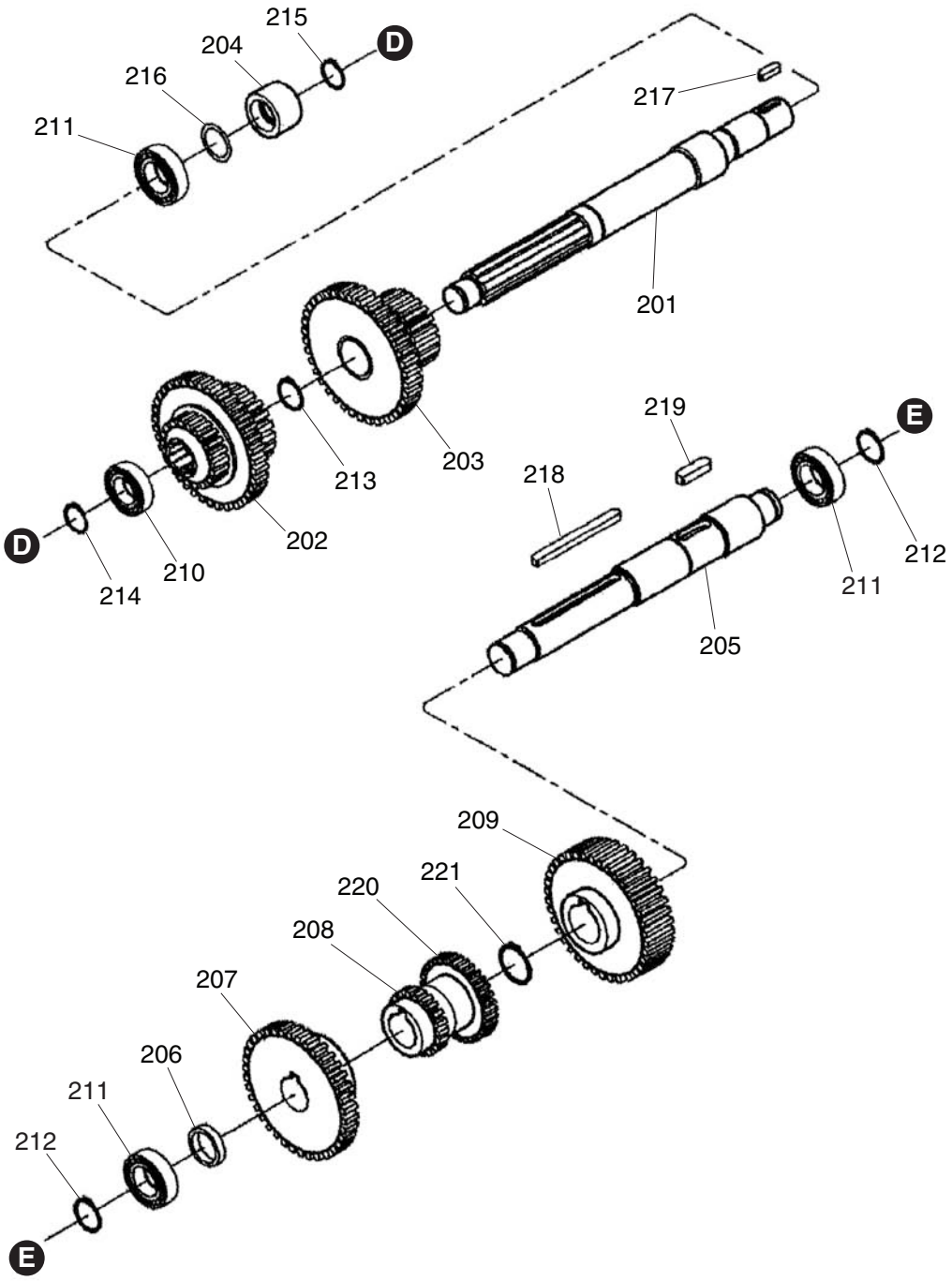
Headstock Gears 1



REF	PART #	DESCRIPTION
101	P9730101	MAIN SPINDLE
102	P9730102	"A" SHAFT
103	P9730103	BUSHING
104	P9730104	BEARING WASHER 20 X 28.5 X 4.1
105	P9730105	GEAR 45T
106	P9730106	GEAR 30T
107	P9730107	"B" SHAFT
108	P9730108	COMPOUND GEAR 33T/48T/55T/41T
109	P9730109	DOUBLE GEAR 22T/60T
110	P9730110	LOCK COLLAR 50-16
111	P9730111	GEAR 82T
112	P9730112	GEAR 44T
113	P9730113	GEAR 38T
114	P9730114	"C" SHAFT
115	PW03M	FLAT WASHER 6MM
116	P9730116	DOUBLE GEAR 35T/35T
117	P9730117	CAMLOCK
118	P9730118	CAMLOCK STUD
119	P32211	TAPERED ROLLER BEARING 32211
120	P30210	TAPERED ROLLER BEARING 30210

REF	PART #	DESCRIPTION
121	P6004ZZ	BALL BEARING 6004 ZZ
122	P6204ZZ	BALL BEARING 6204 ZZ
123	PR78M	EXT RETAINING RING 55MM
124	PR43M	EXT RETAINING RING 50MM
125	PR62M	EXT RETAINING RING 42MM
126	PR09M	EXT RETAINING RING 20MM
127	PR19M	EXT RETAINING RING 28MM
128	PR11M	EXT RETAINING RING 25MM
129	PORP021	O-RING 20.8 X 2.4 P21
130	P9730130	COMPRESSION SPRING
131	PK151M	KEY 8 X 8 X 55
132	PK158M	KEY 8 X 8 X 50
133	PK107M	KEY 8 X 8 X 20
134	PCAP01M	CAP SCREW M6-1 X 16
135	PCAP11M	CAP SCREW M8-1.25 X 16
136	P9730136	CAMLOCK SET PIN
137	PK07M	KEY 6 X 6 X 20
138	P9730138	GEAR 23T
139	P9730139	GEAR 37T
140	PCAP26M	CAP SCREW M6-1 X 12

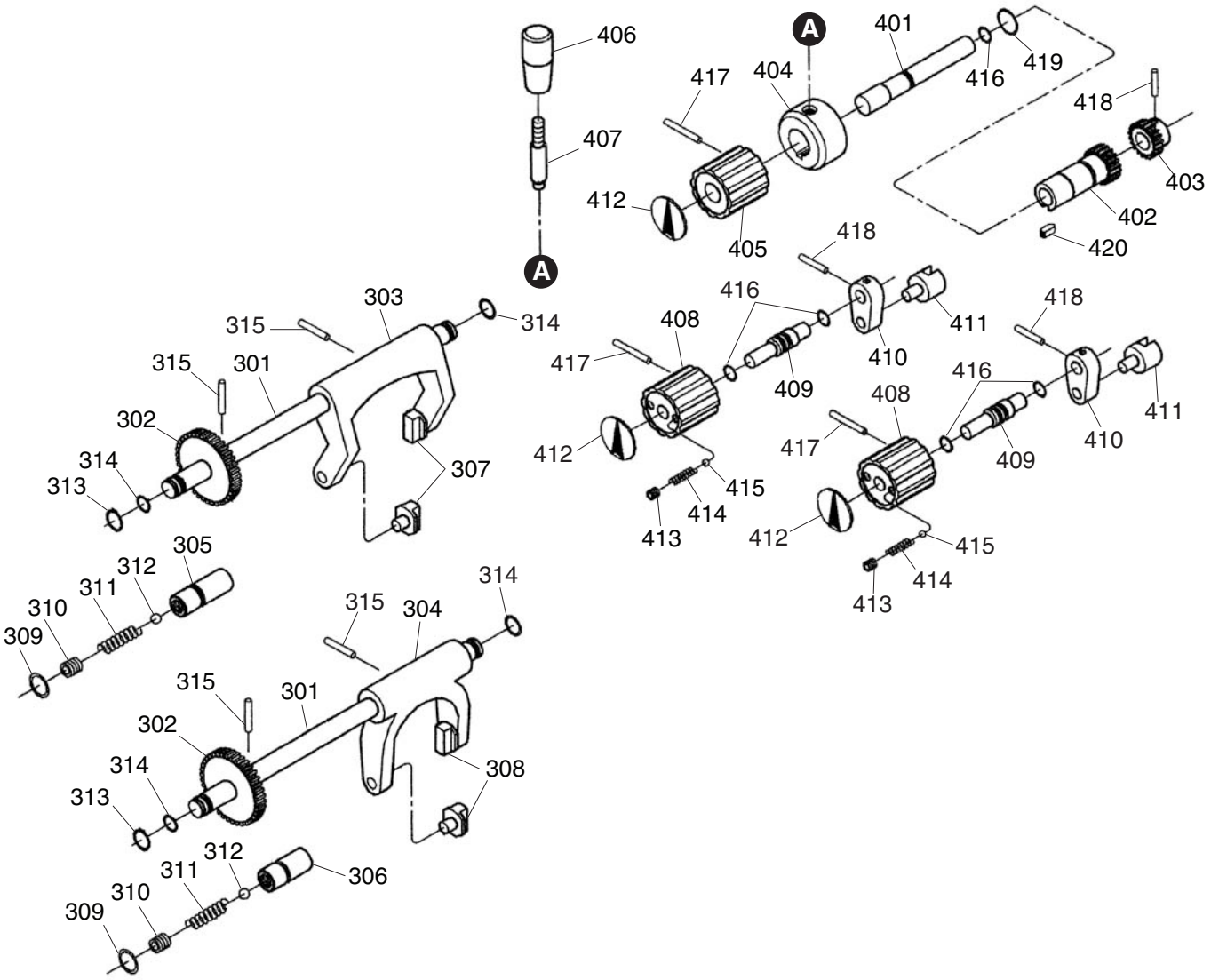
Headstock Gears 2



REF	PART #	DESCRIPTION
201	P9730201	"D" SHAFT
202	P9730202	COMPOUND GEAR 20T/40T/30T
203	P9730203	COMPOUND GEAR 20T/38T
204	P9730204	BUSHING
205	P9730205	"E" SHAFT
206	P9730206	BEARING WASHER 20 X 25 X 5
207	P9730207	GEAR 40T
208	P9730208	GEAR 20T
209	P9730209	GEAR 40T
210	P6203ZZ	BALL BEARING 6203 ZZ
211	P6004ZZ	BALL BEARING 6004 ZZ

REF	PART #	DESCRIPTION
212	PR09M	EXT RETAINING RING 20MM
213	PR58M	EXT RETAINING RING 24MM
214	PR18M	EXT RETAINING RING 17MM
215	PR08M	EXT RETAINING RING 19MM
216	PORP020	O-RING 19.8 X 2.4 P20
217	PK20M	KEY 5 X 5 X 15
218	PK159M	KEY 6 X 6 X 70
219	PK27M	KEY 7 X 7 X 25
220	P9730220	GEAR 30T
221	PR11M	EXT RETAINING RING 25MM

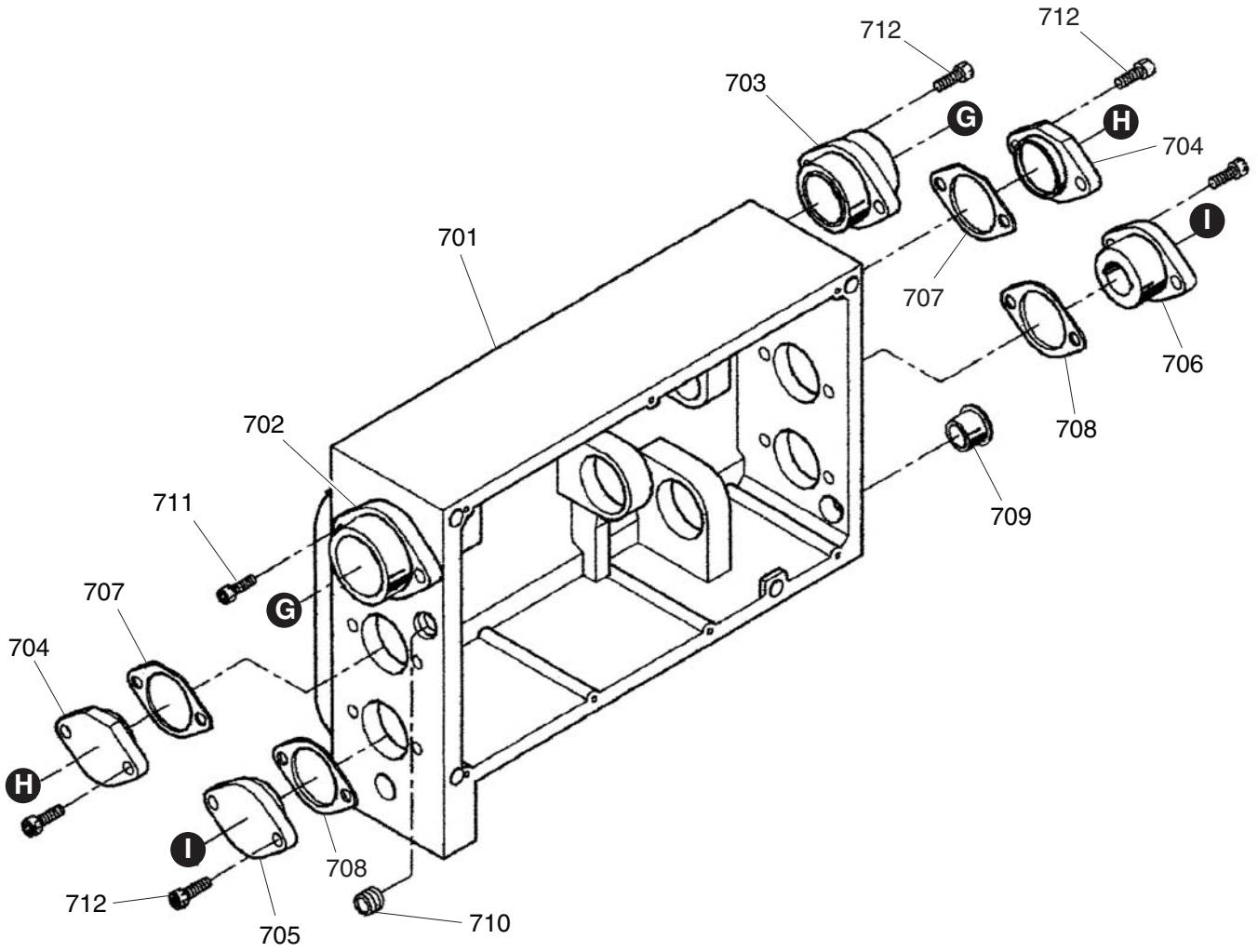
Headstock Controls



REF	PART #	DESCRIPTION
301	P9730301	SHIFT FORK ROD
302	P9730302	GEAR 41T
303	P9730303	LEVER
304	P9730304	LEVER
305	P9730305	SHIFT FORK SLEEVE
306	P9730306	SHIFT FORK SLEEVE
307	P9730307	SHIFT FORK
308	P9730308	SHIFT FORK
309	PORP015	O-RING 14.8 X 2.4 P15
310	PSS15M	SET SCREW M12-1.75 X 12
311	P9730311	COMP SPRING 1.2 X 9.5 X 52 X 14
312	PSTB003	STEEL BALL 3/8
313	PR05M	EXT RETAINING RING 15MM
314	P9730314	O-RING 10.77 X 2.62MM AN62279
315	PRP05M	ROLL PIN 5 X 30
401	P9730401	GEAR SHIFT ROD
402	P9730402	PINION 20T
403	P9730403	GEAR 20T

REF	PART #	DESCRIPTION
404	P9730404	LOCK COLLAR
405	P9730405	KNOB DIAL
406	P9730406	LEVER KNOB
407	P9730407	LEVER
408	P9730408	DIAL KNOB
409	P9730409	GEAR SHIFT SHAFT
410	P9730410	SHIFT CAM
411	P9730411	SHIFT FORK
412	P9730412	ARROW PLATE
413	PSS20M	SET SCREW M8-1.25 X 8
414	P9730414	COMP SPRING 1.2 X 4.2 X 40.5 X 14
415	PSTB001	STEEL BALL 1/4
416	PORP012	O-RING 11.8 X 2.4 P12
417	PRP28M	ROLL PIN 5 X 40
418	PRP06M	ROLL PIN 5 X 24
419	PORP021	O-RING 20.8 X 2.4 P21
420	PK99M	KEY 6 X 6 X 15

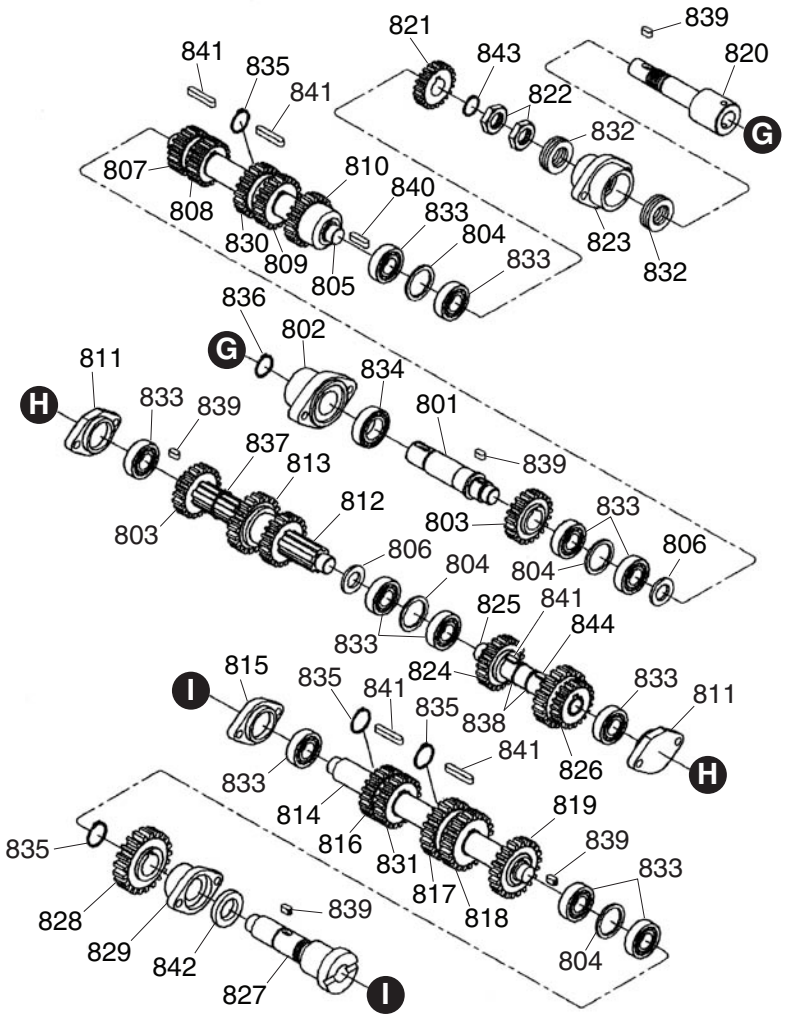
Gearbox Casing



REF	PART #	DESCRIPTION
701	P9730701	INCH GEARBOX CASE
702	P9730702	BEARING SEAT
703	P9730703	BEARING SEAT
704	P9730704	CASING COVER
705	P9730705	CASING COVER GASKET
706	P9730706	BEARING SEAT

REF	PART #	DESCRIPTION
707	P9730707	CASING COVER GASKET
708	P9730708	BEARING SEAT GASKET
709	P9730709	OIL SIGHT GLASS
710	P9730710	PLUG 1/4 PT
711	PCAP01M	CAP SCREW M6-1 X 16
712	PCAP02M	CAP SCREW M6-1 X 20

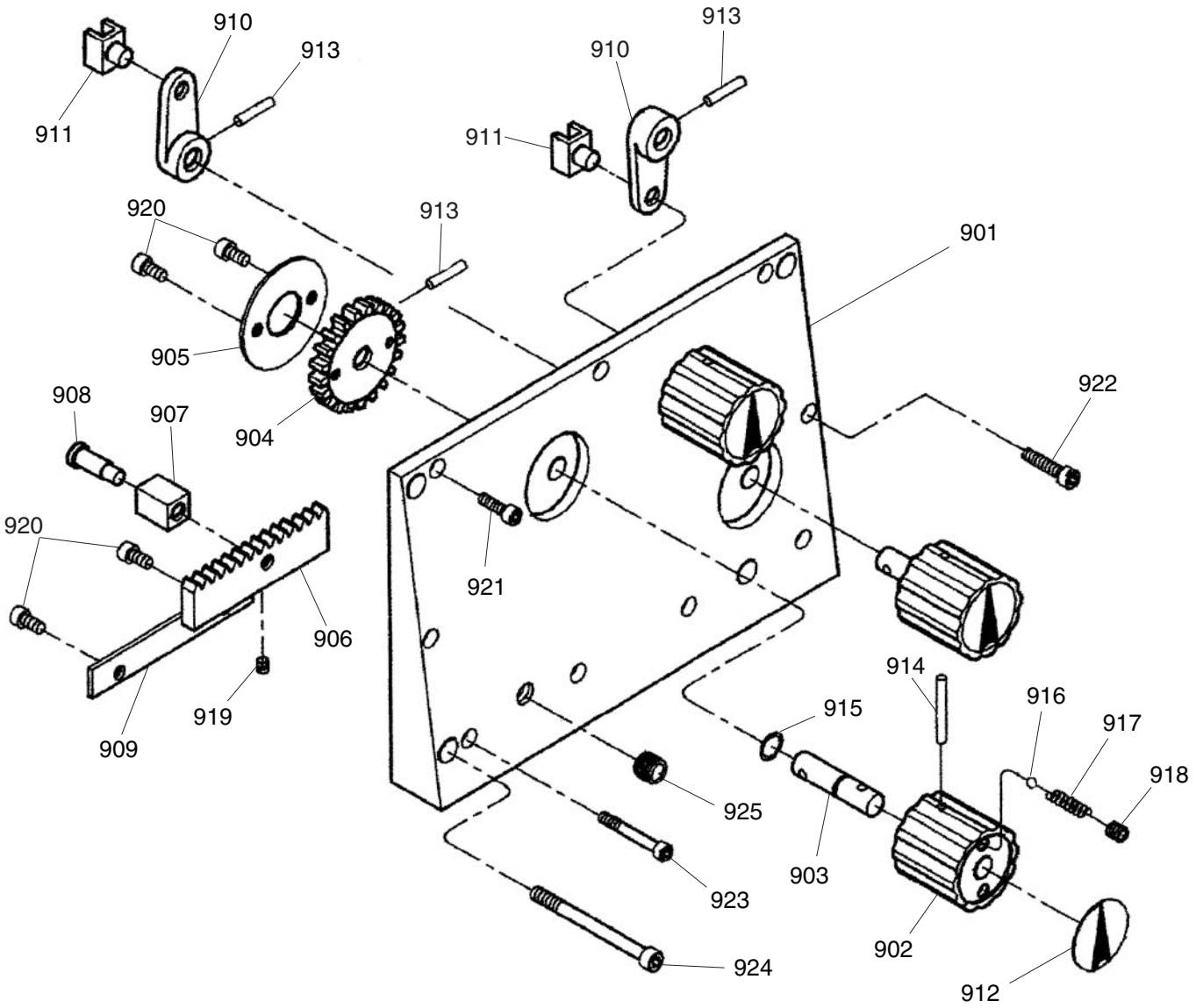
Gearbox Gears



REF	PART #	DESCRIPTION
801	P9730801	"G" DRIVE SHAFT
802	P9730802	BEARING END CAP
803	P9730803	GEAR 21T
804	P9730804	BEARING WASHER 1" X 1 X 1.5"
805	P9730805	"G" TOP SHAFT
806	P9730806	BEARING WASHER 15 X 1 X 2.5
807	P9730807	GEAR 16T
808	P9730808	GEAR 18T
809	P9730809	GEAR 24T
810	P9730810	GEAR 21T
811	P9730811	BEARING END CAP
812	P9730812	"H" SPLINE SHAFT
813	P9730813	DOUBLE GEAR 24T/24T
814	P9730814	"I" GEAR SHAFT
815	P9730815	BEARING END CAP
816	P9730816	GEAR 20T
817	P9730817	GEAR 26T
818	P9730818	GEAR 28T
819	P9730819	GEAR 21T
820	P9730820	"G" LEADSCREW DRIVE SHAFT
821	P9730821	GEAR 18T
822	PN09	HEX NUT 5/8-18

REF	PART #	DESCRIPTION
823	P9730823	BEARING SEAT
824	P9730824	GEAR 21T
825	P9730825	"H" SHAFT
826	P9730826	GEAR 24T/19T
827	P9730827	"I" FEED ROD DRIVE SHAFT
828	P9730828	GEAR 26T
829	P9730829	BEARING SEAT
830	P9730830	GEAR 23T
831	P9730831	GEAR 22T
832	P51103	THRUST BEARING 51103
833	P6002ZZ	BALL BEARING 6002 ZZ
834	P6004ZZ	BALL BEARING 6004 ZZ
835	PR09M	EXT RETAINING RING 20MM
836	PR08M	EXT RETAINING RING 19MM
837	PR10M	EXT RETAINING RING 22MM
838	PR07M	EXT RETAINING RING 18MM
839	PK06M	KEY 5 X 5 X 10
840	PK34M	KEY 5 X 5 X 20
841	PK12M	KEY 5 X 5 X 30
842	P9730842	OIL SEAL TC20 X 32 X 5
843	PR05M	EXT RETAINING RING 15MM
844	PK15M	KEY 5 X 5 X 35

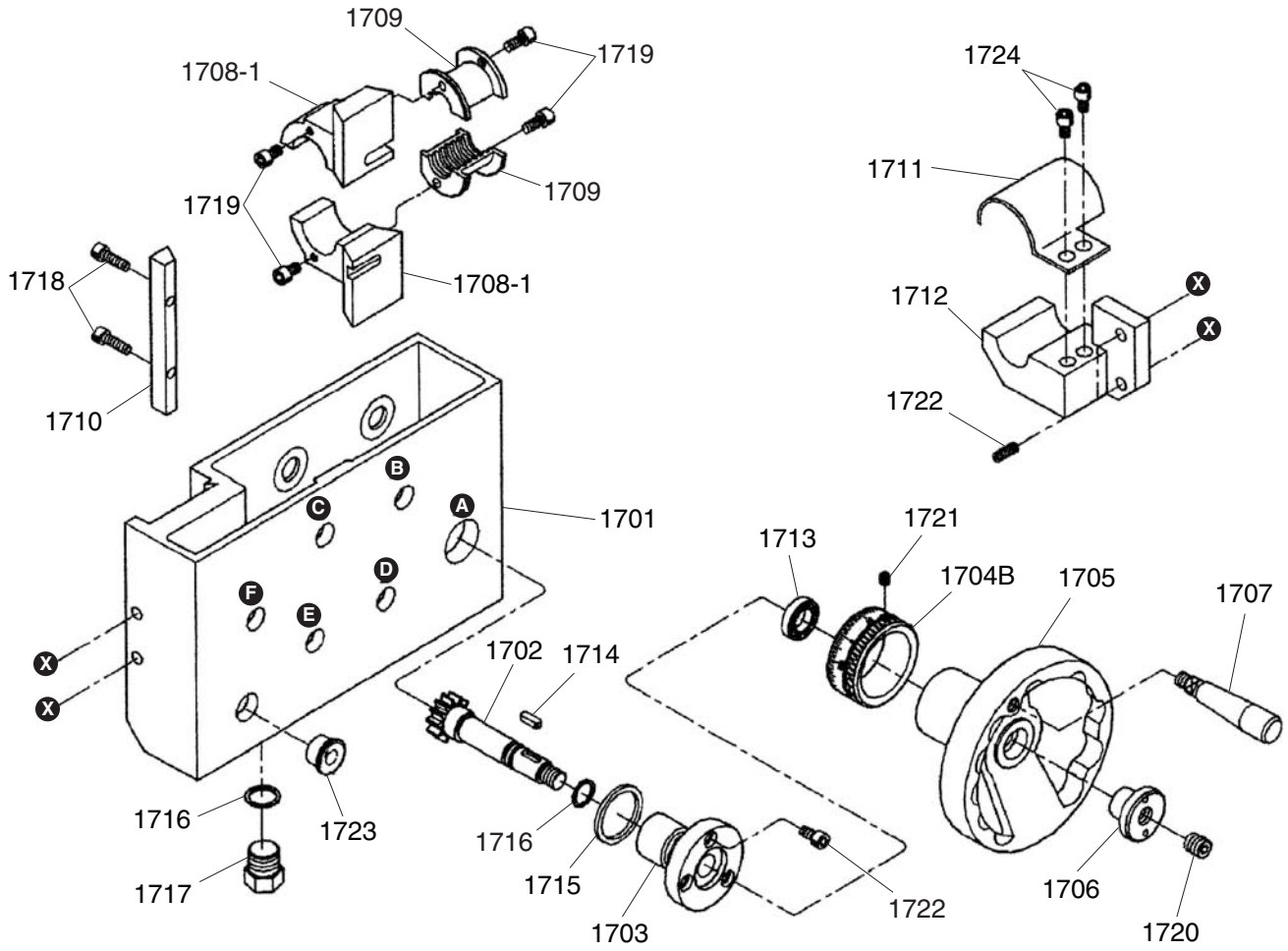
Gearbox Controls



REF	PART #	DESCRIPTION
901	P9730901	INCH GEARBOX COVER
902	P9730902	HANDLE KNOB
903	P9730903	KNOB SHAFT
904	P9730904	GEAR 29T
905	P9730905	GEAR RETAINING PLATE
906	P9730906	RACK
907	P9730907	SQUARE BUSHING
908	P9730908	STEP PIN
909	P9730909	GUIDE PLATE
910	P9730910	SHIFT ARM
911	P9730911	SHIFT FORK
912	P9730912	ARROW PLATE
913	PRP42M	ROLL PIN 3 X 20

REF	PART #	DESCRIPTION
914	PRP28M	ROLL PIN 5 X 40
915	PORP010	O-RING 9.8 X 1.9 P10
916	PSTB001	STEEL BALL 1/4
917	P9730917	COMP SPRING 1.2 X 4.2 X 40.5 X 14
918	PSS20M	SET SCREW M8-1.25 X 8
919	PSS02M	SET SCREW M6-1 X 6
920	PCAP01M	CAP SCREW M6-1 X 16
921	PCAP26M	CAP SCREW M6-1 X 12
922	PCAP06M	CAP SCREW M6-1 X 25
923	PCAP29M	CAP SCREW M6-1 X 40
924	PCAP157M	CAP SCREW M8-1.25 X 100
925	P9730710	PLUG 1/4 PT

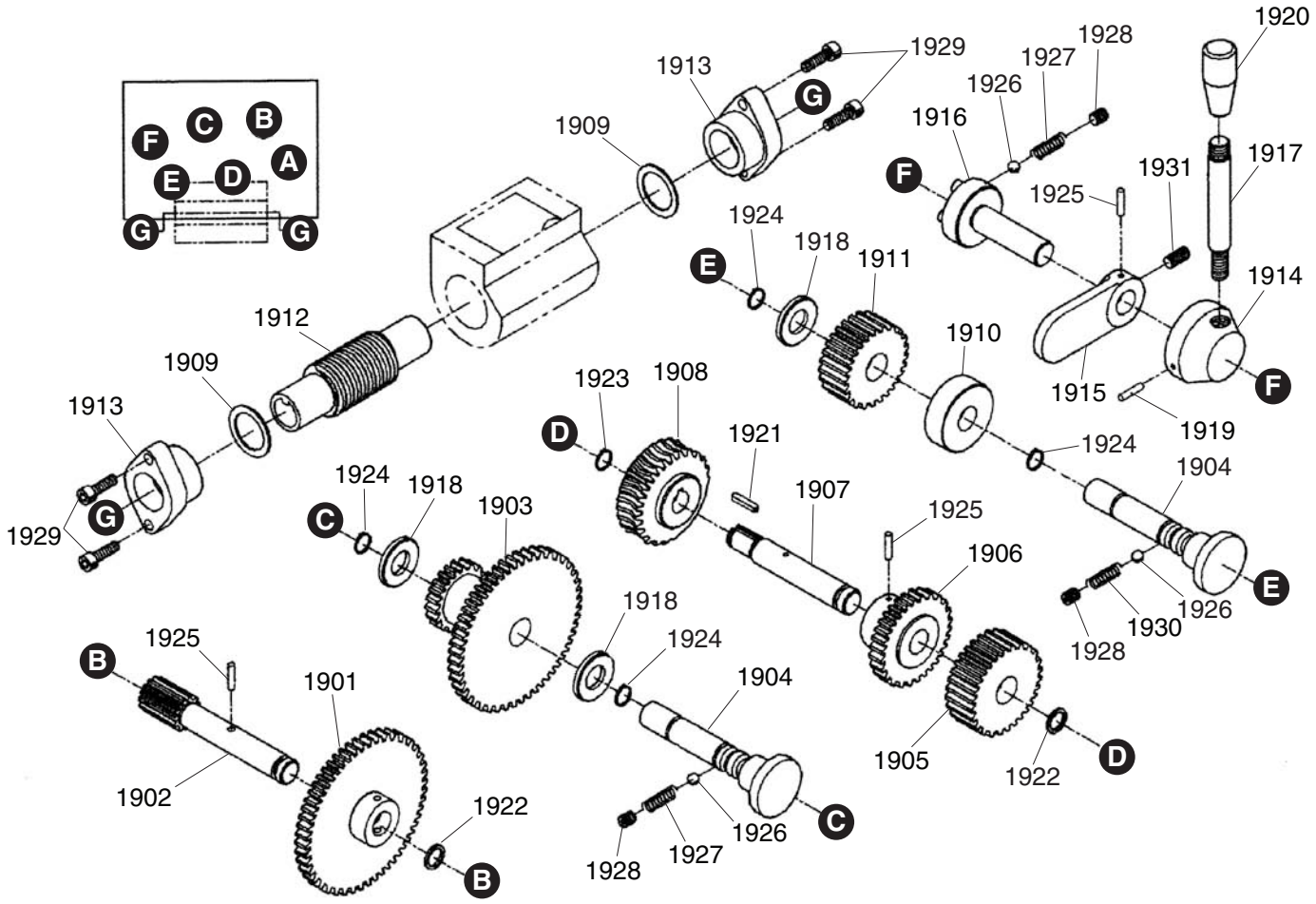
Apron



REF	PART #	DESCRIPTION
1701	P97301701	RIGHT HAND APRON CASING
1702	P97301702	GEAR SHAFT 13T
1703	P97301703	BUSHING
1704B	P97301704B	INDEX RING INCH
1705	P97301705	HANDWHEEL
1706	P97301706	PLUG
1707	P97301707	HANDLE
1708-1	P97301708-1	HALF-NUT BRACKET ASSY 8 TPI
1709	P97301709	HALF-NUT SET 8 TPI INCH
1710	P97301710	HALF-NUT GIB
1711	P97301711	BRACKET COVER
1712	P97301712	BRACKET

REF	PART #	DESCRIPTION
1713	P1528	THRUST NEEDLE BEARING 1528
1714	PK20M	KEY 5 X 5 X 15
1715	PORP012	O-RING 11.8 X 2.4 P12
1716	PORP014	O-RING 13.8 X 2.4 P14
1717	P97301717	OIL DRAIN PLUG M12-1.75 X 16
1718	PCAP02M	CAP SCREW M6-1 X 20
1719	PCAP10M	CAP SCREW M5-.8 X 15
1720	PSS15M	SET SCREW M12-1.75 X 12
1721	PCAP85M	CAP SCREW M6-1 X 6
1722	PCAP01M	CAP SCREW M6-1 X 16
1723	P97301723	OIL SIGHT GLASS 29MM
1724	PCAP26M	CAP SCREW M6-1 X 12

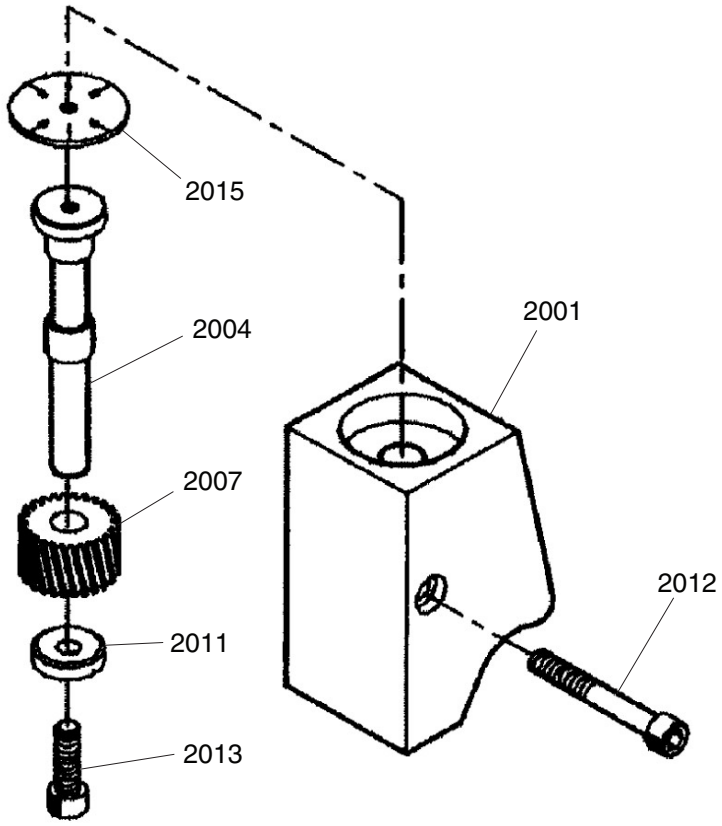
Apron Gears



REF	PART #	DESCRIPTION
1901	P97301901	GEAR 50T
1902	P97301902	GEAR SHAFT 13T
1903	P97301903	DOUBLE GEAR 20T/51T
1904	P97301904	PULL-PUSH LEVER
1905	P97301905	GEAR 28T
1906	P97301906	GEAR 28T
1907	P97301907	GEAR SHAFT
1908	P97301908	PINION GEAR 28T
1909	P97301909	BEARING WASHER 25 X 34 X 1
1910	P97301910	COLLAR
1911	P97301911	GEAR 25T
1912	P97301912	WORM
1913	P97301913	BUSHING
1914	P97301914	HANDLE HUB
1915	P97301915	LEVER
1916	P97301916	CAM SHAFT

REF	PART #	DESCRIPTION
1917	P97301917	LEVER
1918	P97301918	BEARING WASHER 16 X 31.75 X 3
1919	PRP05M	ROLL PIN 5 X 30
1920	P97301920	HANDLE
1921	PK47M	KEY 4 X 4 X 15
1922	PORP012	O-RING 11.8 X 2.4 P12
1923	PR02M	EXT RETAINING RING 14MM
1924	PR03M	EXT RETAINING RING 12MM
1925	PRP05M	ROLL PIN 5 X 30
1926	PSTB001	STEEL BALL 1/4
1927	P97301927	COMP SPRING 1 X 4.5 X 6.5 X 19 X 7
1928	PSS20M	SET SCREW M8-1.25 X 8
1929	PCAP06M	CAP SCREW M6-1 X 25
1930	P97301930	COMP SPRING 1.2 X 6.3 X 40.5 X 14
1931	PSS02M	SET SCREW M6-1 X 6

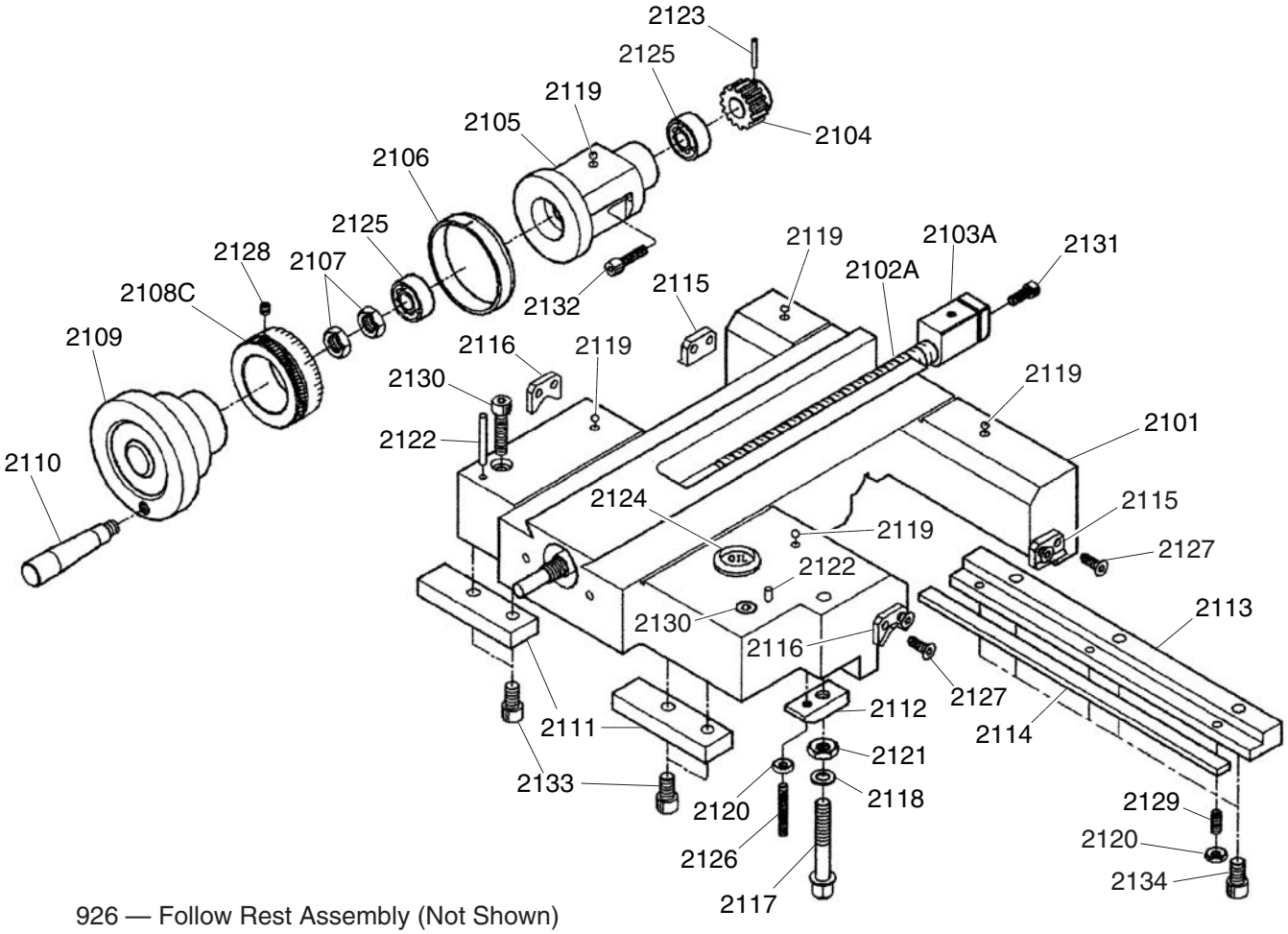
Thread Dial



REF	PART #	DESCRIPTION
2001	P97302001	THREAD DIAL HOUSING
2004	P97302004	THREAD DIAL SHAFT
2007	P97302007	GEAR 24T
2011	P97302011	BEARING WASHER 1/4" X 19 X 4

REF	PART #	DESCRIPTION
2012	PCAP30M	CAP SCREW M6-1 X 45
2013	PCAP02M	CAP SCREW M6-1 X 20
2015	P97302015	THREAD DIAL

Carriage

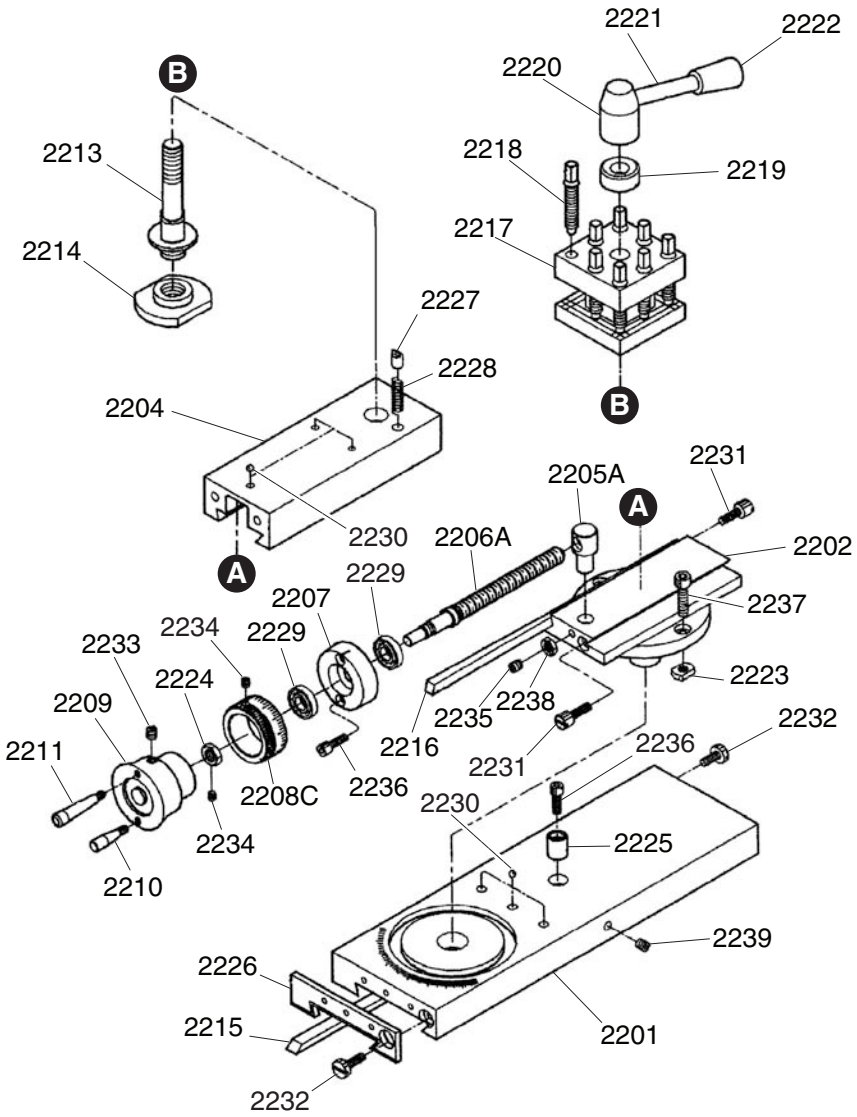


926 — Follow Rest Assembly (Not Shown)
927 — Steady Rest Assembly (Not Shown)

REF	PART #	DESCRIPTION
926	P9730926	FOLLOW REST ASSEMBLY
927	P9730950	STEADY REST ASSEMBLY
2101	P97302101	CARRIAGE CASTING
2102A	P97302102A	CROSS LEADSCREW 16-10 X 423
2103A	P97302103A	CROSS FEED NUT 16-10 INCH
2104	P97302104	CROSS FEED PINION
2105	P97302105	CROSS FEED KEEPER
2106	P97302106	COLLAR
2107	P97302107	THRUST NUT 1/2-20
2108C	P97302108C	INDEX RING DUAL
2109	P97302109	HANDWHEEL
2110	P97302110	HANDLE
2111	P97302111	FRONT GUIDE BAR
2112	P97302112	CLAMP PLATE
2113	P97302113	REAR GUIDE BAR
2114	P97302114	REAR SADDLE GIB
2115	P97302115	FLAT WIPER
2116	P97302116	V-WIPER

REF	PART #	DESCRIPTION
2117	P97302117	LOCK BOLT M6-1 X 40
2118	PW03M	FLAT WASHER 6MM
2119	PLUBE001	TAP-IN BALL OILER 1/4
2120	PN01M	HEX NUT M6-1
2121	PN01M	HEX NUT M6-1
2122	PRP30M	ROLL PIN 5 X 50
2123	PRP06M	ROLL PIN 5 X 24
2124	P97302124	OIL CAP
2125	P2902	THRUST BEARING 2902
2126	PSS90M	SET SCREW M6-1 X 40
2127	PS09M	PHLP HD SCR M5-.8 X 10
2128	PSS02M	SET SCREW M6-1 X 6
2129	PSS25M	SET SCREW M6-1 X 20
2130	PCAP05M	CAP SCREW M8-1.25 X 50
2131	PCAP10M	CAP SCREW M5-.8 X 15
2132	PCAP06M	CAP SCREW M6-1 X 25
2133	PCAP11M	CAP SCREW M8-1.25 X 16
2134	PCAP14M	CAP SCREW M8-1.25 X 20

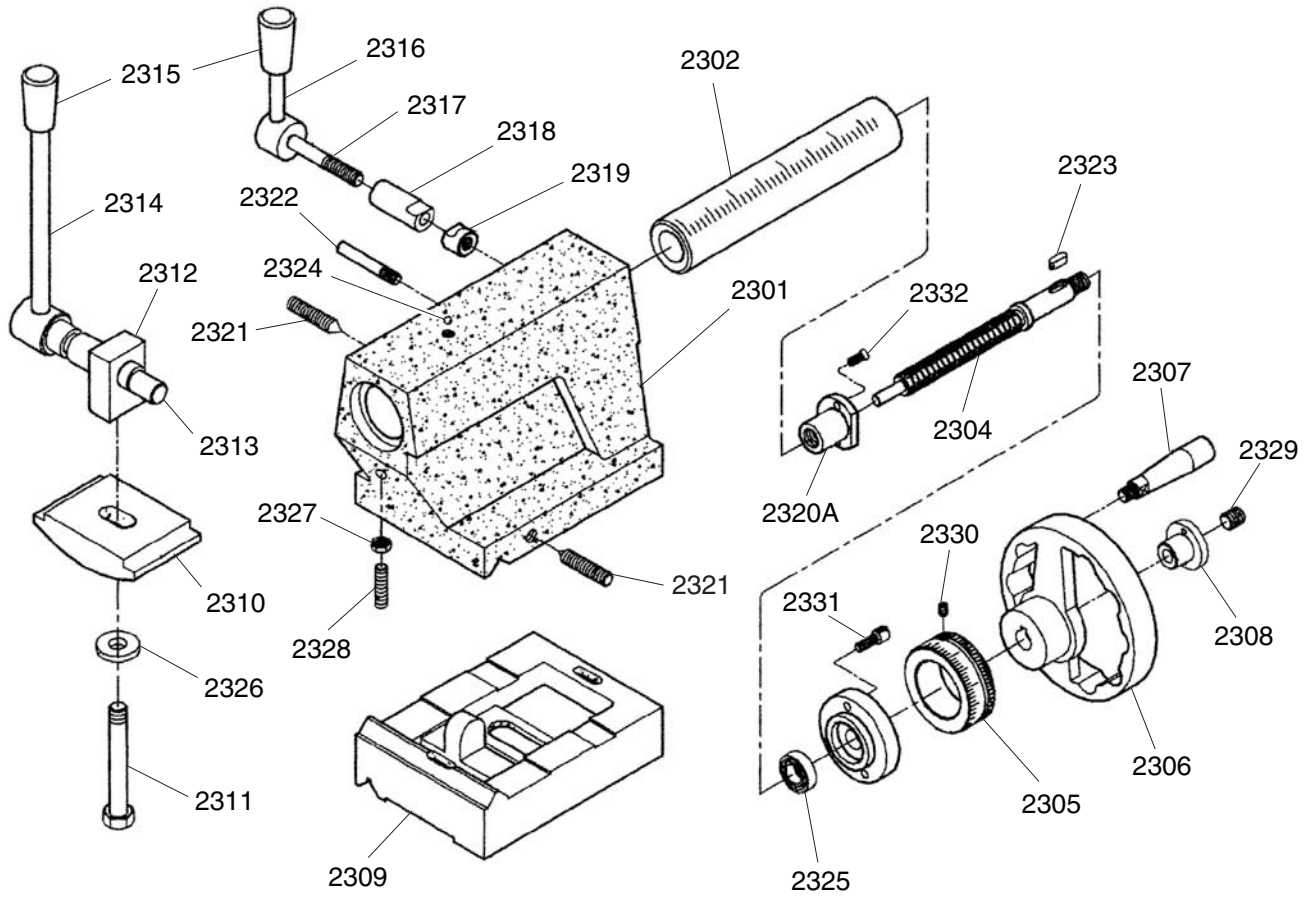
Slides



REF	PART #	DESCRIPTION
2201	P97302201	CROSS SLIDE
2202	P97302202	SWIVEL BASE
2204	P97302204	COMPOUND SLIDE INCH
2205A	P97302205-1	LEADSCREW NUT 13.5-10 INCH
2206A	P97302206A	COMPOUND LEADSCREW INCH
2207	P97302207	BEARING LOCK COLLAR
2208C	P97302208C	INDEX RING DUAL/INCH
2209	P97302209	HANDWHEEL
2210	P97302210	HANDLE SHORT
2211	P97302211	HANDLE LONG
2213	P97302213	TOOL POST STUD INCH
2214	P97302214	CLAMP NUT 1/2-13 INCH
2215	P97302215	CROSS SLIDE GIB
2216	P97302216	COMPOUND SLIDE GIB
2217	P97302217	4-WAY TOOL POST
2218	P97302218	TOOL POST BOLT M10-1.5 X 43
2219	P97302219	BEARING WASHER 16 X 32 X 13
2220	P97302220	HANDLE HUB
2221	P97302221	HANDLE LEVER

REF	PART #	DESCRIPTION
2222	P97302222	HANDLE KNOB
2223	P97302223	T-NUT M8-1.25
2224	P97302224	LOCK COLLAR 7/16-20
2225	P97302225	BUSHING
2226	P97302226	WIPER
2227	P97302227	TOOL POST PLUNGER
2228	P97302228	COMPRESSIONS SPRING 5 X 1 X .8
2229	P51103	THRUST BEARING 51103
2230	PLUBE001	TAP-IN BALL OILER 1/4
2231	P97302231	GIB SCREW M6-1 X 23
2232	P97302232	GIB SCREW 1/4-20 X 22
2233	PSS09M	SET SCREW M8-1.25 X 20
2234	PSS02M	SET SCREW M6-1 X 6
2235	PSS25M	SET SCREW M6-1 X 20
2236	PCAP02M	CAP SCREW M6-1 X 20
2237	PCAP76M	CAP SCREW M8-1.25 X 18
2238	PN01M	HEX NUT M6-1
2239	PSS20M	SET SCREW M8-1.25 X 8

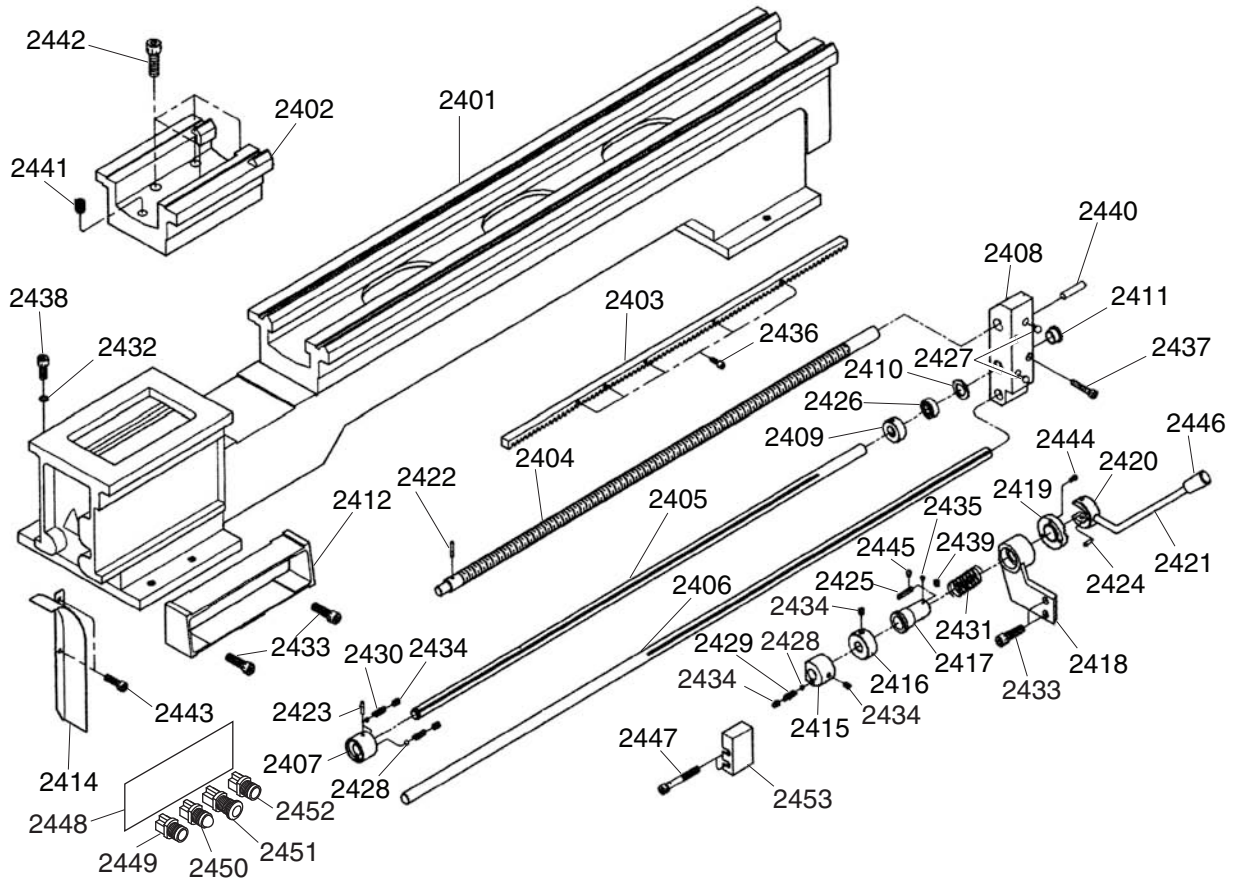
Tailstock



REF	PART #	DESCRIPTION
2301	P97302301	TAILSTOCK BODY
2302	P97302302	TAILSTOCK BARREL
2304	P97302304	LEADSCREW INCH
2305	P97302305	INDEX RING INCH
2306	P97302306	HANDWHEEL
2307	P97302307	HANDLE
2308	P97302308	HANDLE RETAINING WASHER
2309	P97302309	TAILSTOCK BASE
2310	P97302310	CLAMPING PLATE
2311	PB43M	HEX BOLT M12-1.75 X 75
2312	P97302312	PIVOT BLOCK
2313	P97302313	CAM SHAFT
2314	P97302314	TAILSTOCK LOCK LEVER
2315	P97302315	LEVER KNOB
2316	P97302316	QUILL LOCK LEVER
2317	P97302317	CLAMP SHAFT

REF	PART #	DESCRIPTION
2318	P97302318	CLAMP BUSHING
2319	P97302319	CLAMP BUSHING
2320A	P97302320-1	LEADSCREW NUT 16-10 INCH
2321	P97302321	ADJUSTING SCREW M10-1.5 X 40
2322	P97302322	STOP PIN 8 X 55
2323	PK20M	KEY 5 X 5 X 15
2324	PLUBE001	TAP-IN BALL OILER 1/4
2325	P2902	THRUST BEARING 2902
2326	PW01	FLAT WASHER 1/2
2327	PN03M	HEX NUT M8-1.25
2328	PSS44M	SET SCREW M8-1.25 X 40
2329	PSS15M	SET SCREW M12-1.75 X 12
2330	PSS02M	SET SCREW M6-1 X 6
2331	PCAP02M	CAP SCREW M6-1 X 20
2332	PCAP38M	CAP SCREW M5-.8 X 25

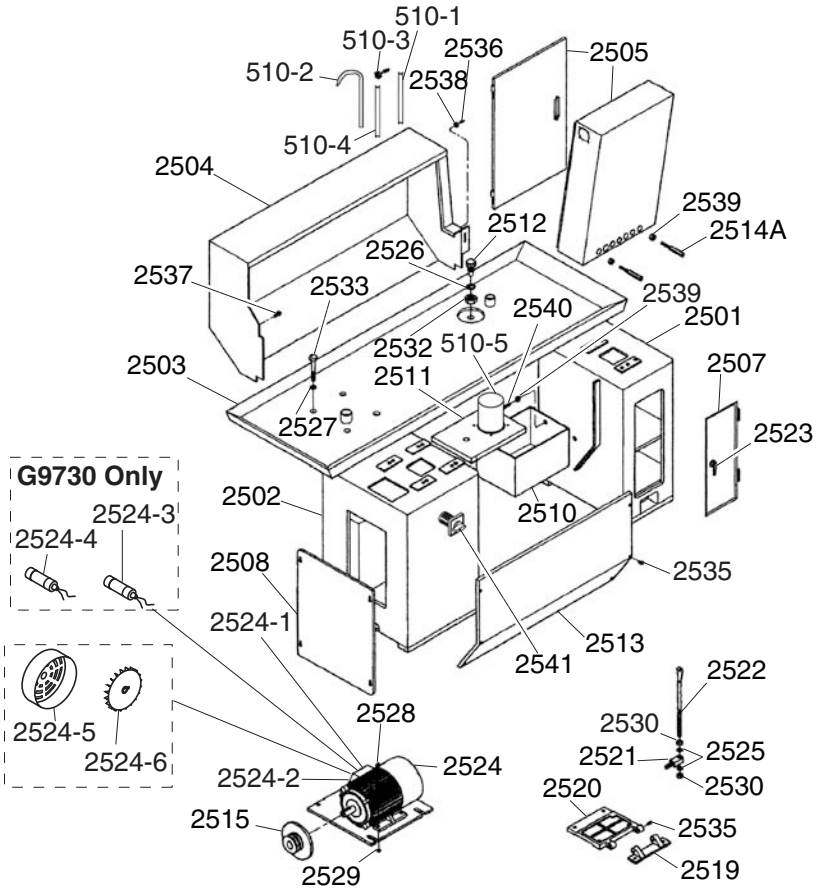
Bed Assembly



REF	PART #	DESCRIPTION
2401	P97302401	GAP BED
2402	P97302402	GAP PIECE
2403	P97302403	RACK
2404	P97302404	LEADSCREW INCH
2405	P97302405	FEED ROD
2406	P97302406	SPINDLE ROD
2407	P97302407	COUPLING
2408	P97302408	END BRACKET
2409	P97302409	COLLAR
2410	P97302410	BEARING WASHER 22.3 X 2.5
2411	P97302411	END BRACKET PLUG
2412	P97302412	CONTROL BOX
2414	P97302414	SIDE COVER
2415	P97302415	CAM COLLAR
2416	P97302416	LOCK COLLAR
2417	P97302417	SLEEVE
2418	P97302418	SPRING HOUSING BRACKET
2419	P97302419	SPINDLE ROD LOCK COLLAR
2420	P97302420	LEVER BOSS
2421	P97302421	LEVER
2422	P97302422	SHEAR PIN
2423	PRP28M	ROLL PIN 5 X 40
2424	PRP35M	ROLL PIN 5 X 10
2425	PK15M	KEY 5 X 5 X 35
2426	P2305-OPEN	BALL BEARING 2305 OPEN
2427	PLUBE001	TAP-IN BALL OILER 1/4

REF	PART #	DESCRIPTION
2428	PSTB001	STEEL BALL 1/4
2429	P97302429	COMP SPRING 1.2 X 4.2 X 40.5 X 14
2430	P97302430	COMP SPRING 1.2 X 3.8 X 21 X 8
2431	P97302431	COMP SPRING 6 X 2 X .8
2432	PLW05M	LOCK WASHER 12MM
2433	PCAP01M	CAP SCREW M6-1 X 16
2434	PSS20M	SET SCREW M8-1.25 X 8
2435	PSS02M	SET SCREW M6-1 X 6
2436	PCAP02M	CAP SCREW M6-1 X 20
2437	PCAP60M	CAP SCREW M8-1.25 x 55
2438	PCAP131M	CAP SCREW M12-1.75 X 45
2439	PSS01M	SET SCREW M6-1 X 10
2440	PRP06M	ROLL PIN 5 X 24
2441	PSS09M	SET SCREW M8-1.25 X 20
2442	PCAP70M	CAP SCREW M10-1.5 X 45
2443	PCAP26M	CAP SCREW M6-1 X 12
2444	PCAP10M	CAP SCREW M5-.8 X 15
2445	PS17M	PHLP HD SCR M4-.7 X 6
2446	P97302446	HANDLE KNOB 3/8-16
2447	P97302447	FLAT HD SCR M4-.7 X 45
2448	P97302448	CONTROL PANEL
2449	P97302449	COOLANT SWITCH
2450	P97302450	POWER LAMP
2451	P97302451	STOP BUTTON
2452	P97302452	ON BUTTON
2453	P97302453	SPINDLE SWITCH

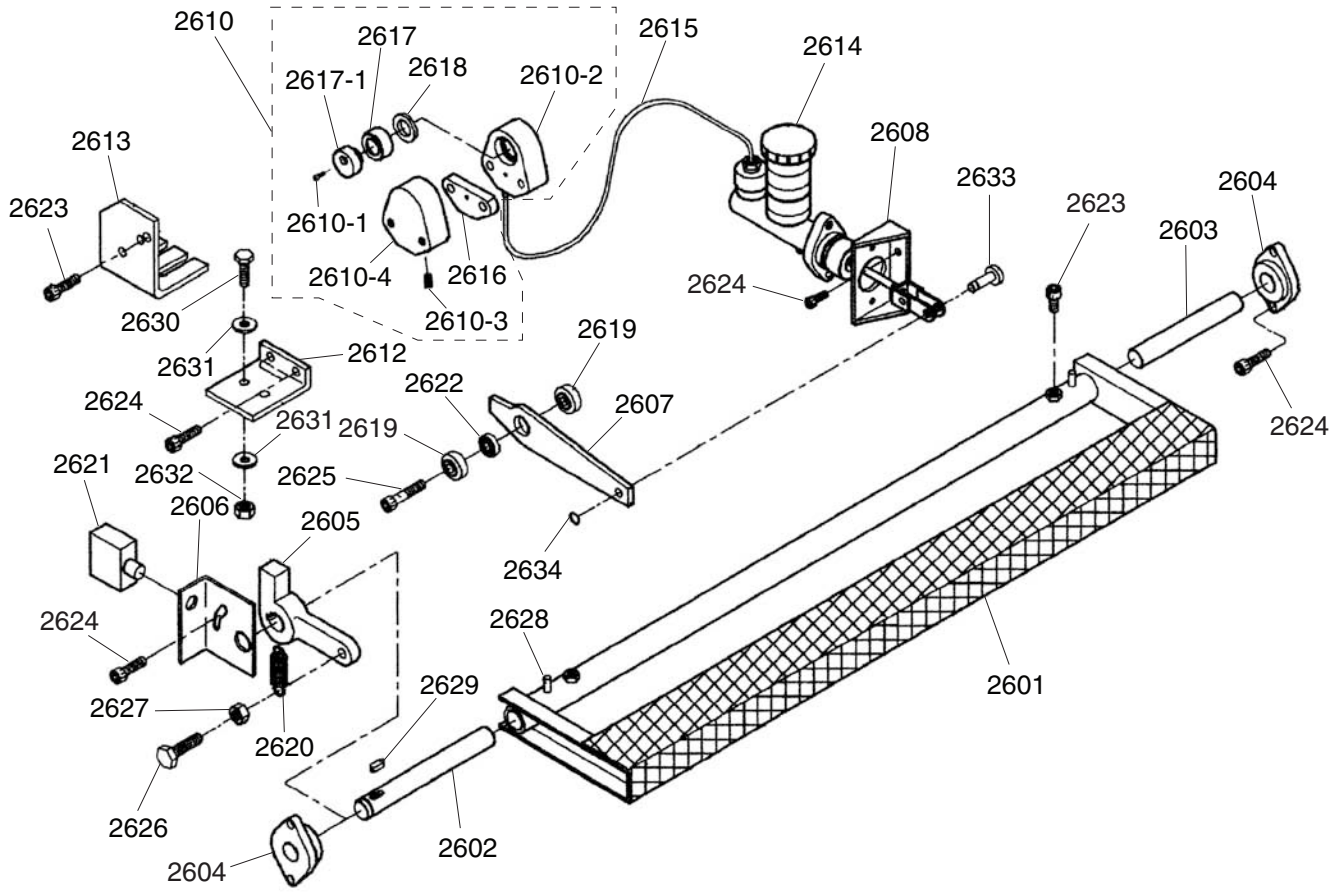
Cabinet Stand



REF	PART #	DESCRIPTION
510-1	P9730510-1	PLASTIC COOLANT HOSE
510-2	P9730510-2	COOLANT NOZZLE
510-3	P9730510-3	COOLANT VALVE
510-4	P9730510-4	COOLANT STAND PIPE
510-5	P9730510-5	COOLANT PUMP
2501	P97302501	RIGHT CABINET
2502	P97302502	LEFT CABINET
2503	P97302503	CHIP PAN
2504	P97302504	SPLASH GUARD
2505	P97302505	ELECTRICAL CABINET W/DOOR
2507	P97302507	CABINET DOOR
2508	P97302508	MOTOR ACCESS PANEL
2510	P97302510	COOLANT TANK
2511	P97302511	TANK COVER
2512	P97302512	CAP
2513	P97302513	PEDESTAL PLATE
2514A	P97302514	STUD
2515	P97302515	MOTOR PULLEY
2519	P97302519	MOTOR MOUNT HINGE
2520	P97302520	MOTOR MOUNT PLATFORM
2521	P97302521	PIVOT ARM
2522	P97302522	MOTOR ADJUSTMENT STUD
2523	P97302523	DOOR HANDLE
2524	P97302524	MOTOR 3HP 220V 1PH (G9730)
2524	P97312524	MOTOR 3HP 220V 3PH (G9731)

REF	PART #	DESCRIPTION
2524-1	P97302524-1	MOTOR JUNCTION BOX (G9730)
2524-1	P97312524-1	MOTOR JUNCTION BOX (G9731)
2524-2	P97302524-2	TERMINAL BLOCK (G9730)
2524-2	P97312524-2	TERMINAL BLOCK (G9731)
2524-3	P97302524-3	S CAPACITOR 200M 250V (G9730)
2524-4	P97302524-4	R CPACITOR 20M 400V (G9730)
2524-5	P97302524-5	MOTOR FAN COVER (G9730)
2524-5	P97312524-5	MOTOR FAN COVER (G9731)
2524-6	P97302524-6	MOTOR FAN (G9730)
2524-6	P97312524-6	MOTOR FAN (G9731)
2525	PW01	FLAT WASHER 1/2
2526	PORP025	O-RING 24.7 X 3.5 P25
2527	PLW05M	LOCK WASHER 12MM
2528	PLW06M	LOCK WASHER 10MM
2529	PW04M	FLAT WASHER 10MM
2530	PN09M	HEX NUT M12-1.75
2532	PN38	HEX NUT 7/8-14
2533	PB24M	HEX BOLT M12-1.75 X 45
2535	PCAP12M	CAP SCREW M8-1.25 X 40
2536	PCAP02M	CAP SCREW M6-1 X 20
2537	PCAP26M	CAP SCREW M6-1 X 12
2538	PW03M	FLAT WASHER 6MM
2539	PN03M	HEX NUT M8-1.25
2540	PB09M	HEX BOLT M8-1.25 X 20
2541	P97302541	MAIN POWER SWITCH

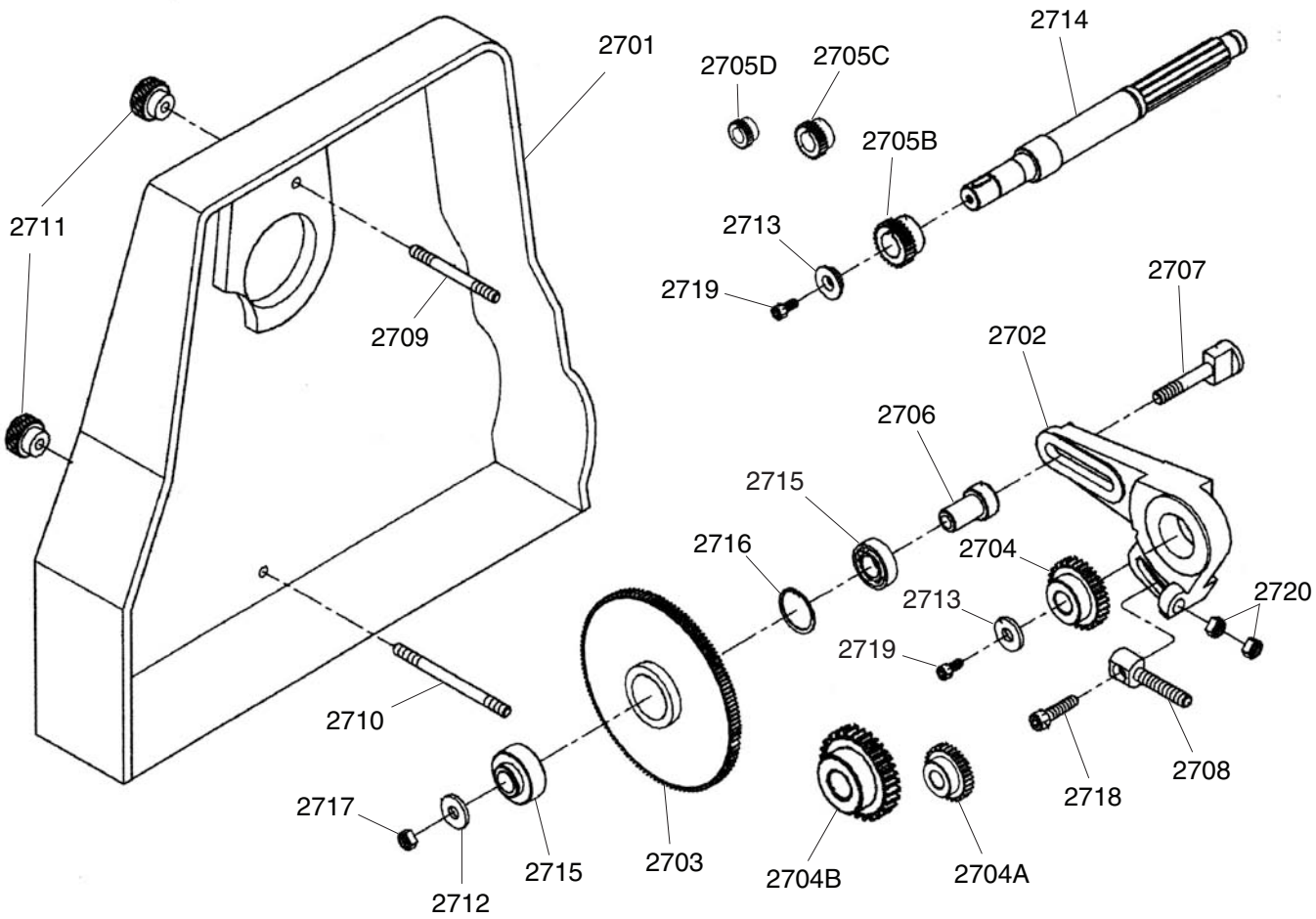
Brake System



REF	PART #	DESCRIPTION
2601	P97302601	FOOT BRAKE PEDAL
2602	P97302602	LEFT BRAKE PEDAL SHAFT
2603	P97302603	RIGHT BRAKE PEDAL SHAFT
2604	P97302604	SHAFT SEAT
2605	P97302605	CRANK
2606	P97302606	CRANK BRACKET
2607	P97302607	BRAKE LEVER
2608	P97302608	MOUNTING PLATE
2610	P97302610	BRAKE ASSEMBLY
2610-1	P97302610-1	BRASS FLAT HD SCREW
2610-2	P97302610	LEFT BRAKE HOUSING
2610-3	P97302610	BLEEDER PLUG
2610-4	P97302610	RIGHT BRAKE HOUSING
2612	P97302612	BOTTOM BRAKE SUPPORT
2613	P97302613	TOP BRAKE SUPPORT
2614	P97302614	HYDRAULIC PUMP
2615	P97302615	OIL TUBE
2616	P97302616	BRAKE PAD SET OF 2
2617	P97302617	BRAKE PISTON

REF	PART #	DESCRIPTION
2617-1	P97302617-1	PISTON CAP
2618	PORP028	O-RING 27.7 X 3.5 P28
2619	P97302619	BUSHING
2620	P97302620	EXTENSION SPRING 7 X 2 X 1.5
2621	P97302621	BRAKE SWITCH
2622	P608ZZ	BALL BEARING 608 ZZ
2623	PCAP11M	CAP SCREW M8-1.25 X 16
2624	PCAP01M	CAP SCREW M6-1 X 16
2625	PCAP12M	CAP SCREW M8-1.25 X 40
2626	PB126M	HEX BOLT M8-1.25 X 40
2627	PN03M	HEX NUT M8-1.25
2628	P97302628	TAPER PIN 1/8
2629	PK99M	KEY 6 X 6 X 15
2630	PB10M	HEX BOLT M6-1 X 25
2631	PW03M	FLAT WASHER 6MM
2632	PN01M	HEX NUT M6-1
2633	P97302633	STEP PIN
2634	PR04M	EXT RETAINING RING 6MM

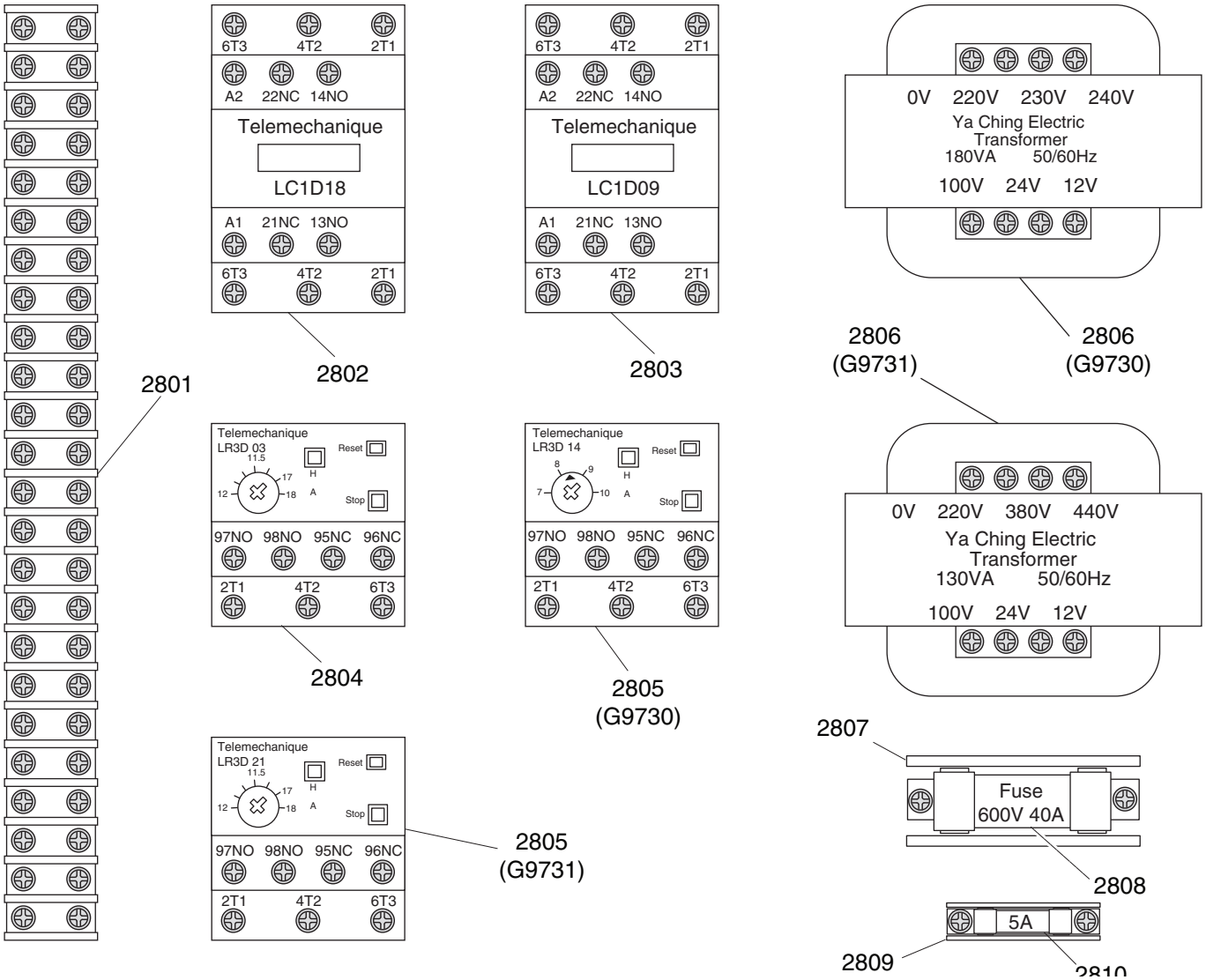
End Gears



REF	PART #	DESCRIPTION
2701	P97302701	END COVER
2702	P97302702	END GEAR BRACKET
2703	P97302703	IDLER GEAR INCH
2704	P97302704	END GEAR 40T INCH
2704A	P97302704A	END GEAR 32T INCH
2704B	P97302704B	END GEAR 50T INCH
2705B	P97302705B	END GEAR 40T INCH
2705C	P97302705C	END GEAR 30T INCH
2705D	P97302705D	END GEAR 25T INCH
2706	P97302706	BEARING SHAFT
2707	P97302707	BEARING BOLT 3/8-16 X 72
2708	P97302708	BRACKET BOLT 3/8-24 X 68

REF	PART #	DESCRIPTION
2709	P97302709	TOP END COVER BOLT
2710	P97302710	BOTTOM END COVER BOLT
2711	P97302711	KNURLED KNOB
2712	P97302712	GEAR WASHER 10 X 3
2713	P97302713	GEAR WASHER 1/4" X 1.5
2714	P97302714	GEAR TRAIN SHAFT
2715	P6003ZZ	BALL BEARING 6003 ZZ
2716	PR12M	EXT RETAINING RING 35MM
2717	PN08	HEX NUT 3/8-16
2718	PCAP13M	CAP SCREW M8-1.25 X 30
2719	PCAP26M	CAP SCREW M6-1 X 12
2720	PN08	HEX NUT 3/8"-16

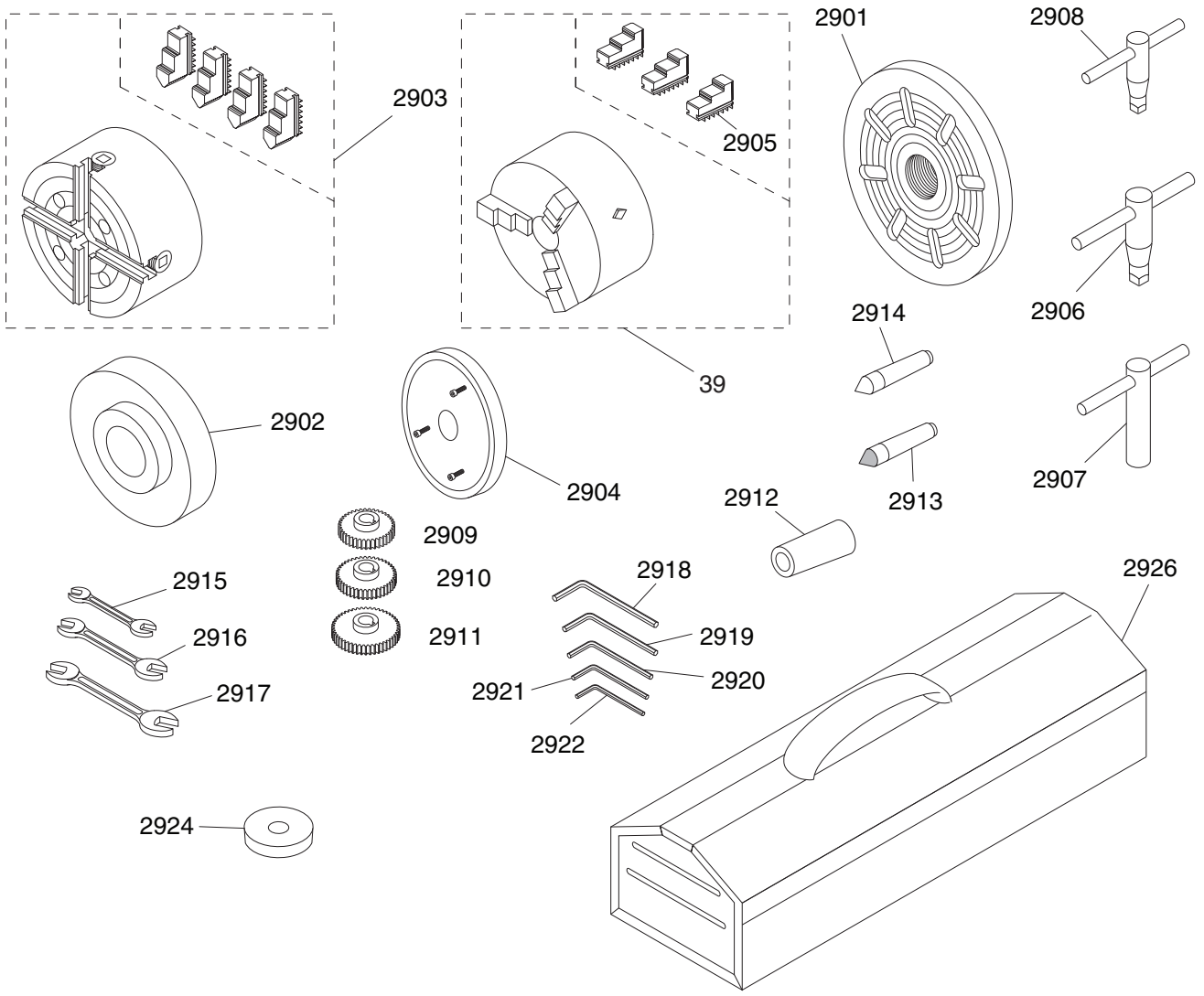
Electrical Cabinet Components



REF	PART #	DESCRIPTION
2801	P97302801	TERMINAL BAR 24P
2802	P97302802	CONTACTOR TELE LC1D18 110V (G9730)
2803	P97302803	CONTACTOR TELE LC1D09 110V
2804	P97302804	OL RELAY TELE LR3D03 2.5-4A
2805	P97302805	OL RELAY TELE LR3D21 12-18A (G9730)
2805	P97312805	OL RELAY TELE LR3D14 7-10A (G9731)

REF	PART #	DESCRIPTION
2806	P97302806	TRANSFORMER YA CHING 220V (G9730)
2806	P97312806	TRANSFORMER YA CHING 440V (G9731)
2807	P97302807	FUSE HOLDER 40A
2808	P97302808	FUSE 600V 40A
2809	P97302809	FUSE HOLDER 5A
2810	P97302810	FUSE 5A

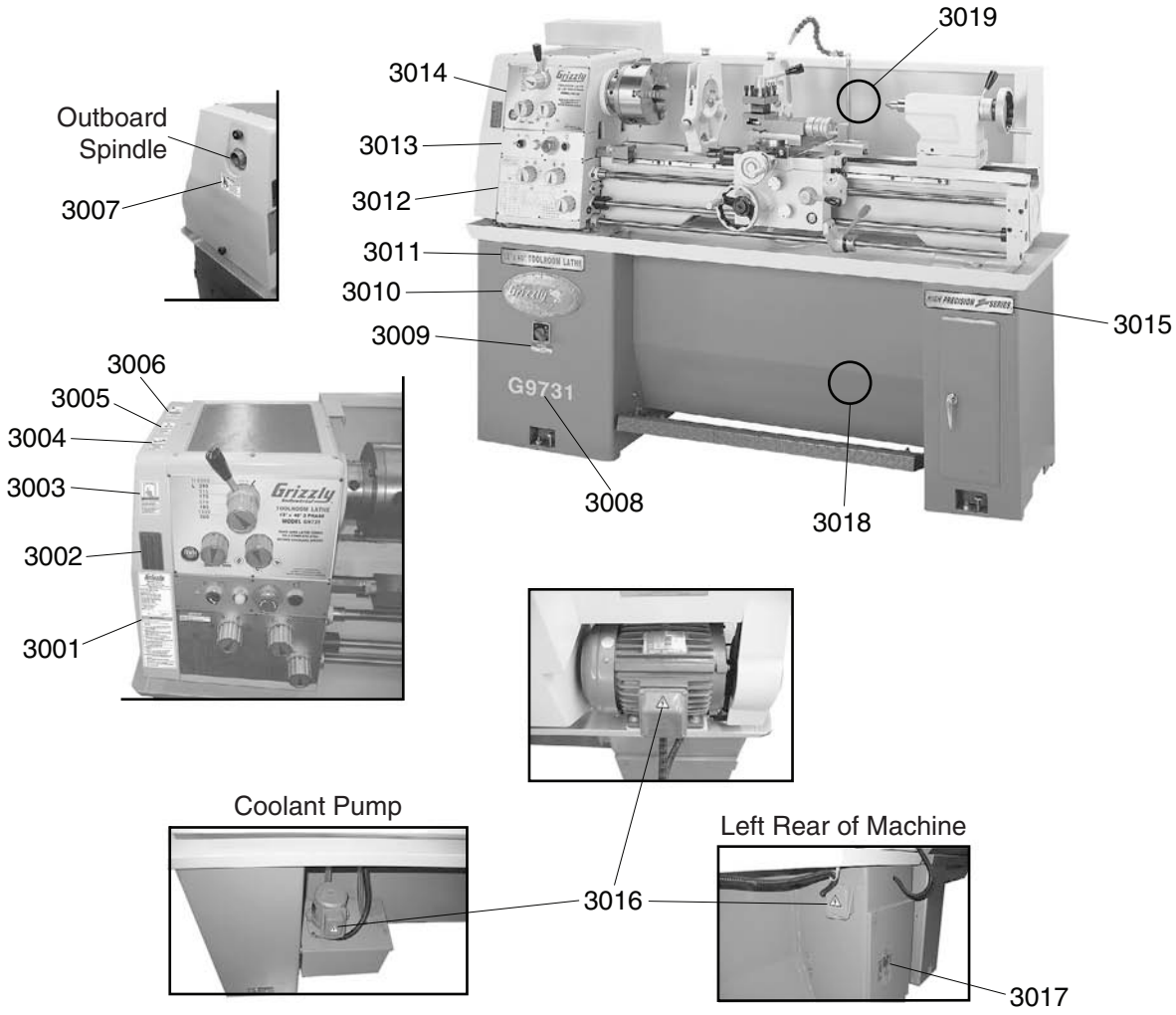
Accessories



REF	PART #	DESCRIPTION
39	P9730039	3-JAW CHUCK 7" W/JAWS
2901	P97302901	FACEPLATE 10"
2902	P97302902	BACK PLATE 8"
2903	P97302903	4-JAW CHUCK 8" W/JAW SET
2904	P97302904	DRIVE PLATE 7"
2905	P9730039	3-JAW CHUCK REVERSE JAWS
2906	P97302906	4-JAW CHUCK KEY
2907	P97302907	TOOL POST KEY
2908	P97302908	3-JAW CHUCK KEY
2909	P97302909	END GEAR 30T
2910	P97302910	END GEAR 32T
2911	P97302911	END GEAR 40T
2912	P97302912	SPINDLE SLEEVE MT#4.5-MT#3

REF	PART #	DESCRIPTION
2913	P97302913	DEAD CENTER MT#3 CARBIDE TIP
2914	P97302914	DEAD CENTER MT#3 HSS
2915	PWR1113	COMBO WRENCH 11/13
2916	PWR1214	COMBO WRENCH 12/14
2917	PWR1719	COMBO WRENCH 17/19
2918	PAW03M	HEX WRENCH 3MM
2919	PAW04M	HEX WRENCH 4MM
2920	PAW05M	HEX WRENCH 5MM
2921	PAW06M	HEX WRENCH 6MM
2922	PAW08M	HEX WRENCH 8MM
2924	P97302924	CAST IRON FOOT PAD
2926	P97302926	TOOLBOX

Machine Labels



REF	PART #	DESCRIPTION
3001	P97303001	MACHINE ID LABEL (G9730)
3001	P97313001	MACHINE ID LABEL (G9731)
3002	P97303002	THREAD DIAL CHART PLATE
3003	PLABEL-12A	READ MANUAL LABEL
3004	PLABEL-11A	EYE INJURY HAZARD LABEL
3005	PLABEL-63	DISCONNECT POWER LABEL
3006	PLABEL-55	ENTANGLEMENT HAZARD LABEL
3007	P97303007	OUTBOUND ENTANGLEMENT LABEL
3008	P97303008	MODEL NUMBER LABEL (G9730)
3008	P97313008	MODEL NUMBER LABEL (G9731)
3009	P97303009	SWITCH OFF NOTICE LABEL
3010	G8589	GRIZZLY OVAL NAMEPLATE

REF	PART #	DESCRIPTION
3011	P97303011	TOOLROOM LATHE LABEL
3012	P97303012	GEARBOX PANEL PLATE (G9730)
3012	P97313012	GEARBOX PANEL PLATE (G9731)
3013	P97303013	CONTROL PANEL PLATE
3014	P97303014	HEADSTOCK PANEL PLATE
3015	P97303015	PRECISION Z SERIES LABEL
3016	PLABEL-14A	ELECTRICITY LABEL
3017	P97303017	MOTOR/POWER INFO PLATE (G9730)
3017	P97313017	MOTOR/POWER INFO PLATE (G9731)
3018	PPAINT-1	GRIZZLY GREEN TOUCH-UP PAINT
3019	PPAINT-11	GRIZZLY PUTTY TOUCH-UP PAINT

⚠WARNING

Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.

Grizzly Industrial, Inc. WARRANTY CARD

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Phone # _____ Email _____ Invoice # _____

Model # _____ Order # _____ Serial # _____

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1. How did you learn about us?

____ Advertisement ____ Friend ____ Catalog
____ Card Deck ____ Website ____ Other:

2. Which of the following magazines do you subscribe to?

____ Cabinetmaker & FDM
____ Family Handyman
____ Hand Loader
____ Handy
____ Home Shop Machinist
____ Journal of Light Cont.
____ Live Steam
____ Model Airplane News
____ Old House Journal
____ Popular Mechanics
____ Popular Science
____ Popular Woodworking
____ Precision Shooter
____ Projects in Metal
____ RC Modeler
____ Rifle
____ Shop Notes
____ Shotgun News
____ Today's Homeowner
____ Wood
____ Wooden Boat
____ Woodshop News
____ Woodsmith
____ Woodwork
____ Woodworker West
____ Woodworker's Journal
____ Other:

3. What is your annual household income?

____ $20,000-$29,000 ____ $30,000-$39,000 ____ $40,000-$49,000
____ $50,000-$59,000 ____ $60,000-$69,000 ____ $70,000+

4. What is your age group?

____ 20-29 ____ 30-39 ____ 40-49
____ 50-59 ____ 60-69 ____ 70+

5. How long have you been a woodworker/metalworker?

____ 0-2 Years ____ 2-8 Years ____ 8-20 Years ____ 20+ Years

6. How many of your machines or tools are Grizzly?

____ 0-2 ____ 3-5 ____ 6-9 ____ 10+

7. Do you think your machine represents a good value? _____Yes _____No

8. Would you recommend Grizzly Industrial to a friend? _____Yes _____No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?
Note: *We never use names more than 3 times.* _____Yes _____No

10. Comments: _____

_____

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Grizzly Industrial, Inc. warrants every product it sells for a period of **1 year** to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly's sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly's liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly shall be tried in the State of Washington, County of Whatcom.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

To take advantage of this warranty, contact us by mail or phone and give us all the details. We will then issue you a "Return Number,'' which must be clearly posted on the outside as well as the inside of the carton. We will not accept any item back without this number. Proof of purchase must accompany the merchandise.

The manufacturers reserve the right to change specifications at any time because they constantly strive to achieve better quality equipment. We make every effort to ensure that our products meet high quality and durability standards and we hope you never need to use this warranty.

Please feel free to write or call us if you have any questions about the machine or the manual.

Thank you again for your business and continued support. We hope to serve you again soon.

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